SEPTEMBER 21, 1959

STEEL
The Metalworking Weekly

A PENTON PUBLICATION

Ford Leaps Tensile Barrier

Ausforming produces ductile steel with tensile strength up to 500,000 psi. Dr. Victor F. Zackay holds model of fine martensite molecule developed. The success sheds a bright light on the real significance of fine martensite. Metallurgists can now shoot for finer structures at the transformation temperatures of alloys .....Page 84

After the Strike: How Soon Can You Expect to Get Steel Deliveries?

How Aircraftmakers Are Diversifying

Rocketry May Soon Wear Civvies

Plant Spending Boom Here Through '60

Extruding Costly Metals Cuts Scrap, Improves Physical Properties

Investment Casters Eye New Markets

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TURN PAGE

METALWORKING OUTLOOK
PAGE 39

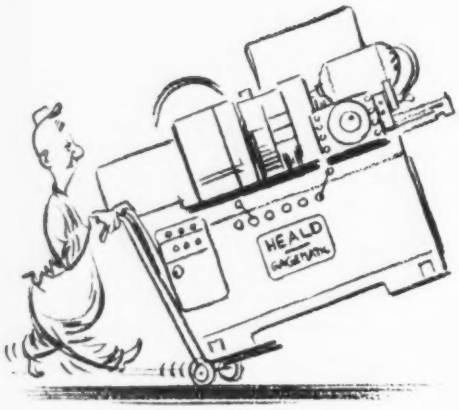
WHY WAIT

longer

for a new machine?

Chances are, Heald has it

IN STOCK!



As a result of Heald's recently instituted stock machine program, the most popular types and sizes of Heald precision finishing machines are normally carried in factory stock at Worcester. Any time you can buy a *stock machine*, and supply your own fixtures and tooling, you get these important advantages . . .

1. FAST DELIVERY. Instead of waiting for several months for a specially built machine, your stock machine will be on its way in a matter of days or weeks.

2. LOWER COST. By eliminating special engineering and drafting, you get a top-quality basic machine at lowest possible cost.

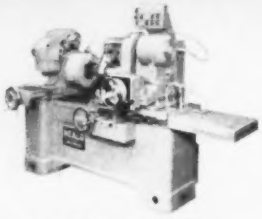
3. UNLIMITED VERSATILITY. Every Heald stock machine has the inherent versatility of speeds, feeds and cycling that permits easy adaptability to virtually any combination or sequence of operations.

If you need a standard machine in a *hurry* — and at minimum cost — it will pay you to check Heald on the availability of a *stock machine* that will meet your requirements.

THESE STANDARD HEALD MACHINES ARE NORMALLY CARRIED IN STOCK

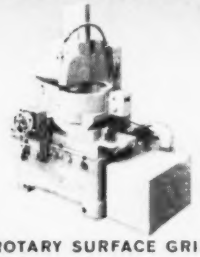
BORE-MATICS

Model "0"
Model 121
Model 221
Model 321
Model 421
Model 222
Model 322
Model 422



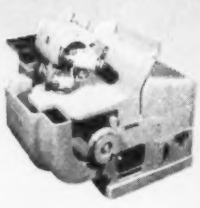
INTERNAL GRINDERS

Model 171 Size-Matic
Model 171 Gage-Matic
Model 271 Plain
Model 271 Size-Matic
Model 271 Gage-Matic
Model 271 Tool Room
Model 272 Basic
Model 273A Universal



ROTARY SURFACE GRINDERS

Model 161 6"
Model 261 16" Plain
Model 261 16" Automatic
Model 361 24" Plain
Model 361 24" Automatic



TOOL SHARPENING MACHINES

Model 3
Model 4

HEALD

THE HEALD MACHINE COMPANY

Subsidiary of The Cincinnati Milling Machine Co.

Worcester 6, Massachusetts

Chicago • Cleveland • Dayton • Detroit • Indianapolis • New York • Syracuse

This Week in STEEL

The Metalworking Weekly

September 21, 1959 Vol. 145—No. 12

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STEEL, the metalworking weekly, is selectively distributed without charge to qualified management personnel with administrative, production, engineering, or purchasing functions in U. S. metalworking plants employing 20 or more. Those unable to qualify, or those wishing home delivered copies, may purchase copies at these rates: U. S. and possessions and Canada, $10 a year; all other countries, $20 a year; single copies, 50 cents. Metalworking Yearbook issue, $2. Published every Monday and copyright 1959 by The Penton Publishing Co., Penton Bldg., Cleveland 13, Ohio. Accepted as controlled circulation publication at Cleveland, Ohio.

Metalworking Pulse ▶

TURN

Metalworking Pulse

INDUSTRIAL PRODUCTION INDEX

	WEEK ENDED SEPT. 12	PREVIOUS WEEK	MONTH AGO	YEAR AGO
(1947-49=100) Based on steel output, electric power output, freight carloadings, auto assemblies	104† †Preliminary.	109	114	135

The latest dip in STEEL's industrial production index is caused by the Labor Day holiday. Unless the effects of the steel strike become more acute than now appears likely, the trend line will up during the rest of the year.

Details on Page 69

U. S. PASSENGER CAR PRODUCTION

	WEEK ENDED SEPT. 19	PREVIOUS WEEK	MONTH AGO	YEAR AGO
Number of units assembled ..... (Source: Ward's Automotive Reports.)	40,000* *Estimated.	22,797† †Preliminary.	31,848	37,150

All automakers are now turning out '60 model cars. By the end of this month, production should be comparable with the fourth quarter of last year. Only parts and trim shortages are likely to slow things down much.

Details on Page 66

NATIONAL STEEL INGOT PRODUCTION

	WEEK ENDED SEPT. 20	PREVIOUS WEEK	MONTH AGO	YEAR AGO
Net tons (thousands)	345*	327	321	1,771
Index (1947-49=100)	21.5*	20.4	20.0	110.2
Percentage of capacity ...	12.5*	11.5	12.0	66.5

*Estimated by STEEL; comparative figures reported by AISI.

The ingot rate went up less than 1 point last week due to upward adjustments at several producing points. August output of 1,438,000 net tons of ingots was the smallest monthly production reported since October, 1949.

Details on Page 130

STEEL SCRAP PRICE COMPOSITE

	SEPT. 16	WEEK AGO	MONTH AGO	YEAR AGO
Based on No. 1 heavy melting grade at Pittsburgh	$41.00	$40.00	$38.33	$43.00

Despite the continued absence of strong consuming demand, scrap prices continue to push into higher ground on dealer-broker transactions. Good poststrike demand is anticipated, along with continued heavy exports, now lending market support.

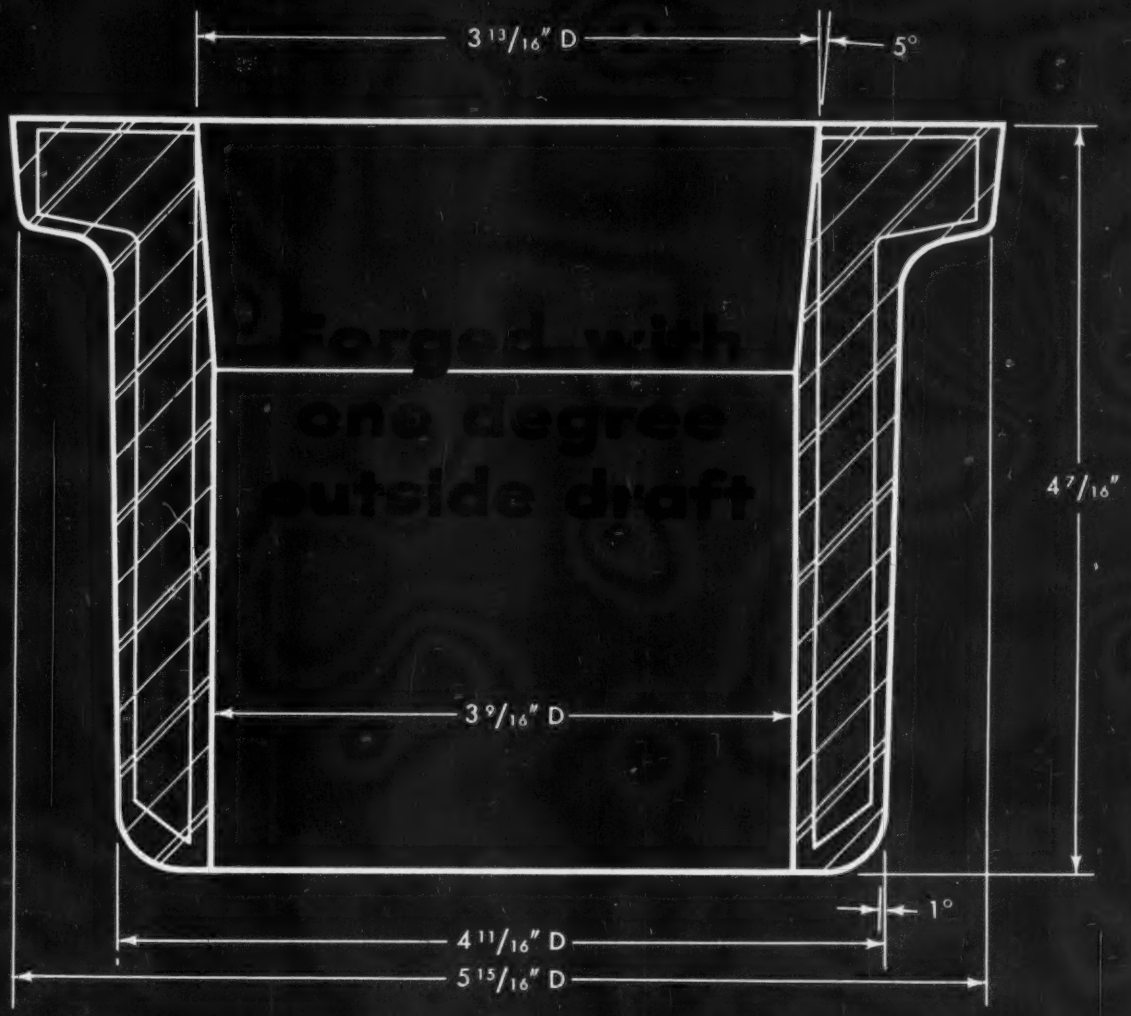
Details on Page 146

FINISHED STEEL PRICE INDEX

	SEPT. 15	WEEK AGO	MONTH AGO	YEAR AGO
Based on Bureau of Labor Statistics data (1947-49=100)	186.7	186.7	186.7	186.5

Prices on domestic steel products continue steady, but strong. Quotations on imports are still tending upward, but at a slow pace. No significant changes in the steel markets are likely until after the current labor dispute is settled.

Details on Page 131



...to save metal and machining dollars

Forging with minimum external and internal drafts is a Bethlehem specialty. Witness the closure hub above.

We forge this part and others like it in a mechanical press to 1 degree outside draft, 5 degree inside draft. Then we hot-broach the inside draft to facilitate internal chucking. By the time this hub arrives at our customer's machine shop, little machining is required. Machining's a lot safer, easier, and faster, too. Because of the small drafts, chuck jaws can get a big bite on the part. They won't slip. Our customer can safely use higher horsepower machine tools, and speed his work.

Because we're able to forge to 1 degree drafts *or less*, the weight of the product can be reduced. That saves metal as well as machining dollars. We'd like to pass on similar savings to you. Call or write our nearest sales office today.

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

Export distributor: Bethlehem Steel Export Corporation

BETHLEHEM STEEL

BETHLEHEM STEEL

NYLOK FASTENERS lock and seal by means of a tough nylon pellet embedded in the body of the fastener. Locking and sealing action is sustained, because the nylon attempts to return to its original shape when deformed. Nylok fasteners make excellent adjustment screws, oil pan and gear case bolts.
LOK-THRED meets conditions of severe vibration, tension, torsion, thermal loading. Lok-Threds can never back out, fret or shake loose. Because of its unique reforming and intimate metal to metal contact, Lok-Thred seals effectively in practically all metals. Widely used on engines and motors of all sizes and types.
PLACE BOLTS have a built-in spring action in the head of the bolt. This provides a safety margin of additional elastic elongation, and greatly reduces danger of fatigue failure in addition to locking. Place Bolts can be used wherever Cap Screws are used, and effect real savings in most applications.

Which self-locking fastener?

Lamson makes all three, helps you cut costs, not corners

Nylok. Lok-Thred. Place Bolt. All are variations on the same theme. However, one of the three will be better suited to your application. One will lower your assembly cost more than the other two. Which one?

Because Lamson makes all three self-locking fasteners . . . standards and specials . . . Lamson engineers are anxious (and able) to recommend the one that's best for you. That helps you make a better product. That helps you cut costs...not corners. Contact a Lamson Sales Engineer for details.

SEND FOR ENGINEERING DATA

Gentleman: Mail engineering data on Place Bolts ☐ Lok-Thred ☐ Nylok ☐

Have nearest Sales Engineer call for appointment ☐

Application we're considering is_____

_____

Name_____

Company_____

Street_____

City_____ State_____

LAMSON & SESSIONS

5000 TIEDEMAN ROAD • CLEVELAND 9, OHIO

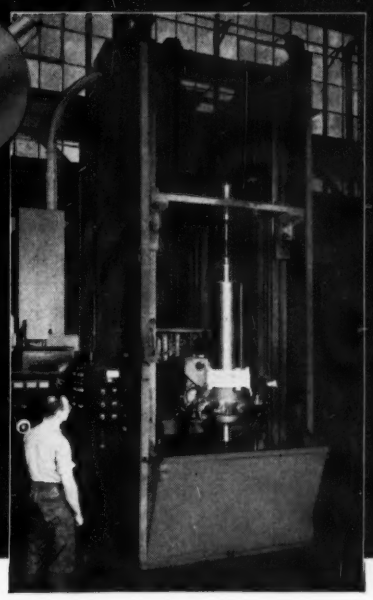
Plants in Cleveland and Kent, Ohio • Chicago and Birmingham

Former Heat-Treating Time—28¼ HOURS
TOCCO Heat-Treating Time—30 MINUTES

Plus

$108 saved on every mill roll

This special mill roll hardening fixture is powered by two 200 KW, 3000 cycle TOCCO machines. Mill roll shown is 12" diameter by approx. 60" long.



with TOCCO* Induction Heating

When progressive engineers at The McKay Machine Company switched from conventional heat-treating methods to TOCCO induction hardening of their mill rolls, they achieved not only increased production but also important cost savings, and perhaps most important of all, a greatly improved product.

56 Times as Fast!

Formerly mill rolls required a 12-hour heat, a 15-minute salt brine quench, 12 hours tempering and a 4-hour cooling period. With TOCCO the whole job is done—and done better—in just 30 minutes—56 times as fast!

Here's Real Economy

Reduced furnace time saves $28.00 per roll. More important, grinding time is cut in half (saving $80 per roll) because TOCCO minimizes distortion and there's less stock that must be removed. Runoff used to be as much as ¼"—frequently requiring a separate straightening operation.

Product Improved

Because TOCCO "scans" the mill roll, i.e. heat treats it progressively, only a small section is at critical temperature at any one time. That's why distortion is minimized and little finish grinding is required. This means that TOCCO-hardened mill rolls have a *more uniform case-hardened depth* than possible with old fashioned methods which in turn means longer life and better performance.

• • •

Why not have a TOCCO engineer survey your plant to determine where TOCCO can reduce your costs, increase production speed and improve product quality?

THE OHIO CRANKSHAFT COMPANY

TOCCO

*Trade Mark Reg. U. S. Pat. Off.

Mail Coupon Today

NEW FREE BULLETIN

THE OHIO CRANKSHAFT CO.
Dept. S-9, Cleveland 5, Ohio

Please send copy of "Typical Results of TOCCO Induction Hardening and Heat Treating."

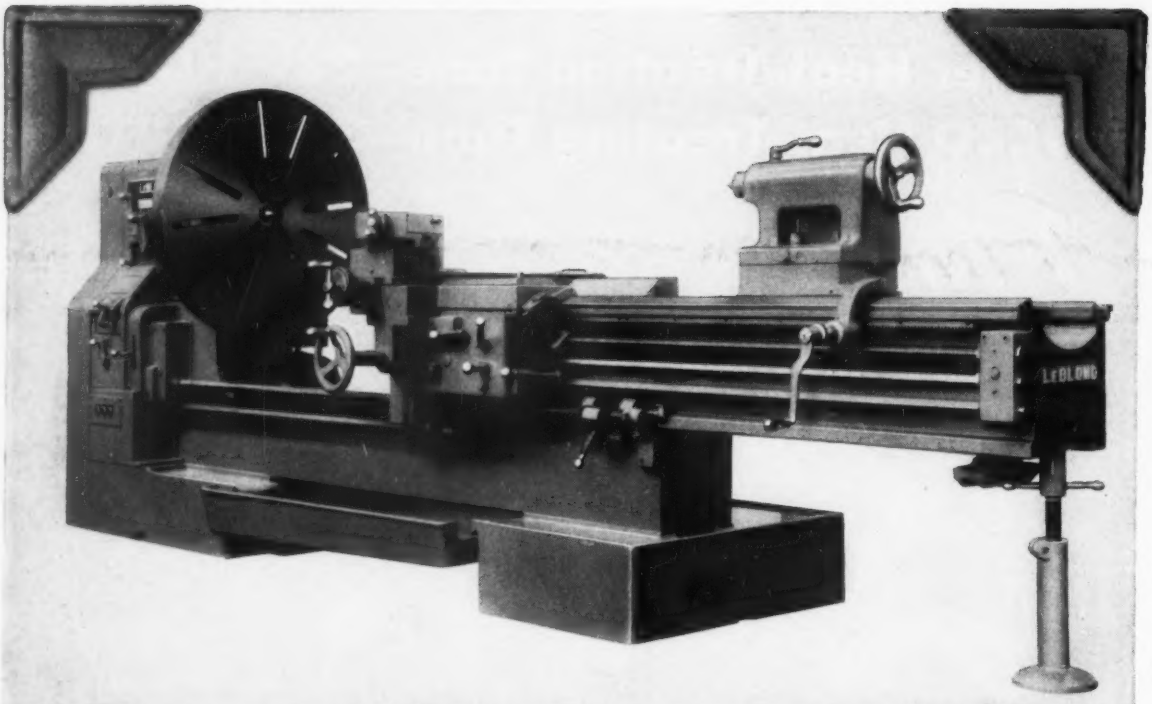
Name_____

Position_____

Company_____

Address_____

City_____ Zone____ State_____



Newest members of the most versatile family in the world

21" *and* 24"/39" Regal

SLIDING BED GAP LATHES

Turning department in one machine!

The LeBlond Sliding Bed Gap Lathe is the most versatile turning machine ever built. With the bed closed it functions as a regular engine lathe. Its special bed *slides* open to form a gap of the proper opening to accept odd-shaped parts and large diameter jobs. Sliding the bed open also provides greater distance between centers. In addition, you get all the outstanding features, the stamina and dependability you expect in a LeBlond Lathe.

The two new members bring the family up to seven! Select the one that suits you best from the chart at right.

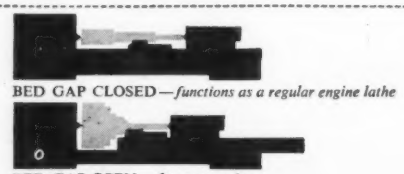
Call your LeBlond Distributor or write-

THE R. K. LeBLOND MACHINE TOOL COMPANY
CINCINNATI, OHIO

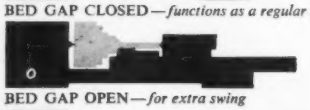
	REGALS		NEW!		HEAVY DUTIES		
	17"/28"	19"/28"	21"/39"	24"/39"	16"/38"	25"/50"	32"/60"
Swing over bed and carrage wings	17¾"	19¼"	22¼"	26"	20½"	30½"	34½"
Swing over gap	35"	36½"	48½"	52½"	46"	56"	61½"
Distance between centers, base, gap closed	30"	30"	48"	48"	72"	96"	84"
Distance between centers, base, gap open	50"	50"	84"	84"	120"	156"	144"
Horsepower, max.	5	5	10	10	20	50	60

Hollow Spindle Head available on all but 17" and 19" models.

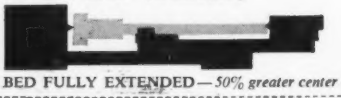
Here's how a LeBlond Sliding Bed Gap Lathe gives you extra capacity, versatality:



BED GAP CLOSED—*functions as a regular engine lathe*



BED GAP OPEN—*for extra swing*



BED FULLY EXTENDED—*50% greater center distance*

STEEL
Servicenter

Please direct all correspondence to attention of Ed Service, STEEL, 1213 W. Third St., Cleveland 13, Ohio.

September 21, 1959

New Readers Every Day

Assistant Editor Bill Olds was doing a cross-country survey by phone when a company spokesman gave him one of our most unusual compliments. The company representative said he had given the United Steelworker members in the company's mill a glimpse of STEEL's Aug. 24 article "McDonald Rides High in USW but . . ." Reaction: "We know STEEL's editors are doing a good job; the union members asked for copies of the story."

Calls like that tell us how we're doing, but there are other ways. Here's one.

This Is Editorial Service

The trim lady perched before the typewriter is Mrs. Irene Kasner. During the last three years, she has sent thousands of tearsheets to readers who request copies of STEEL articles. Her evaluation of the pull of each story gives our editors a handy yardstick for measuring story effectiveness.

If the request is for one to 40 copies, Irene handles it. Others go to our Reprint Department where Miss June Schilens fills the orders. But sometimes it's difficult to handle requests. One classic: "We are particularly interested in an article entitled 'What They Offer' which was published recently in STEEL. We would accordingly appreciate having a copy of this if possible. Please advise."

There are clues to the identity of the article, but the tearsheet could be sent sooner if she were given the title of the article, the issue date, and the page numbers.

(Incidentally, Mrs. Kasner is an avid angler and not long ago hauled in a 14 lb, 42 in. northern pike. She asked that we not mention this, though. Seems she didn't know if Editor Walt Campbell had caught a bigger one, and she didn't want to embarrass him.)

P.S. Her department is Editorial Service, and yours truly is Ed Service. She handles reprints. I handle the Servicenter.

Slow Down, Curve Ahead

"You might be interested in my reaction to the headline over the article on Page 99 of the Aug. 10 issue," writes Fred E. Harrell, general manager, Marquette Div., Curtiss-Wright Corp., Cleveland. "After looking at the head ('Strike Fails to Slow Down Economy'), I looked back at the top of the page and saw the (Industrial Production Index) curve had dropped from 160 on July 15 to 120 on the week ended Aug. 1. I said to myself: 'This is not a slowdown in the economy?' In the two succeeding weeks, the curve had dropped from 121 to 120 which was negligible. The steel strike, in my understanding, is responsible for the drop from 160 to 120 and this is hardly to be interpreted as other than a slowdown in the economy."

Associate Editor Bob Jaynes fields this inquiry, saying: "The chart at the top of The Business Trend department each week concerns metalworking only; the headline and column often deal with the entire economy. Even though the strike had slowed our index, the economy as a whole had suffered little.

"Here's what happened: The steel industry's output is heavily weighted (35 per cent) in our Industrial Production Index. Other factors: Freight carloadings were depressed by the steel strike, and auto phaseouts added to the total drop.

"Please view the charts as separate from the heads in The Business Trend."

This Is No Skeet Shoot

Next week you will get a battlefield look at one of metalworking's peskiest problems—price fighting. Like bush warfare, price fighting is easy to start and tough to shut off. It has always been with us to some extent, but the fray grows hotter during recessions. Remember how the fighting flared up sharply during the unlamented 1958 business troubles? Well, it's still going strong,

SELF-CONTAINED SLITTERS

YODER SLITTERS

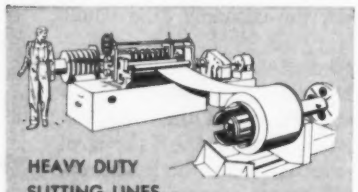
basic equipment for cost-conscious users of strip!

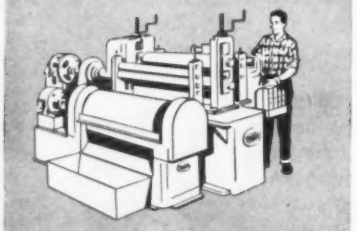
To help meet the demands of tight production schedules, YODER Slitters reduce mill-width stock quickly and economically to desired widths. If your needs are as low as 100 tons per month, time and manpower savings alone will offset the cost of your YODER Slitter in a matter of months, while reducing basic inventories. Compactly designed, standard YODER Slitters are built to handle standard coil widths . . . completely engineered lines for special requirements.

YODER accessories, such as coil cars, swivel unloaders, scrap choppers, scrap disposers, plate levelers and coil boxes, make stock handling fast and easy.

YODER also makes a complete line of Cold Roll-Forming equipment and Pipe and Tube Mills. To profit from YODER'S years of engineering and service experience, contact your local YODER representative or send for the fully illustrated descriptive, YODER Slitter Manual; it's yours for the asking. Write to

THE YODER COMPANY
5502 Walworth Ave. • Cleveland, Ohio


HEAVY DUTY
SLITTING LINES


SCRAP CHOPPERS

ENGINEERING YODER MANUFACTURING
ROTARY SLITTING LINES

despite the economy's upsurge.

Associate Managing Editor John Morgan will file an inspection report from the firing lines for you on this one. His support—nearly half the editorial staff. Many editors were deployed for the reporting job because the conflict is on many fronts.

It's Only in the Labs

We've had numerous inquiries about the commercial availability of fiber metallurgy products which were written up in our Aug. 10 issue.

Armour Research Foundation says its people have perfected the manufacturing process, but haven't developed commercial product applications to any extent. Prices are not available; however, the foundation invites manufacturer contact. If you're interested, we suggested you send a note to Dr. R. H. Read, supervisor of the Metals Department, Armour Research Foundation, Illinois Institute of Technology, 35 W. 33rd St., Chicago 16, Ill.

Playback

Our editors are always interested in knowing how information published in STEEL is used by readers. Here are three examples which gave us a glimpse of readers in action. We call it usership.

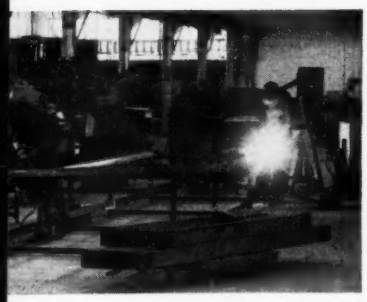
- **Incident No. 1**—An attorney called Market Research Manager Tom Ballantine and said he was working on a civil tax suit. One of the points in contention: The tonnages and base prices of mild steel plates shipped in the first quarter of 1951 from the Youngstown-Cleveland area.
- **Incident No. 2**—Associate Managing Editor Vance Bell was visited by two representatives of a firm doing business with a foreign government. The question: Was the price of a foreign iron ore, listed in STEEL, the asking or sale price? Seems the government needed a price on which to base taxes and there's a 4 cent per unit difference of opinion. That 4 cents could represent hundreds of thousands of dollars for the firm.
- **Incident No. 3**—Bailey Meter Co., Cleveland, had received a substantial order from a metalworking company. The issue: Sales credit on this order would depend upon the classification of the particular account. Charles Bergman, Bailey Meter's assistant advertising manager, called Tom Ballantine and said: "You be the judge. Whatever SIC number you use to classify this account will be used in deciding sales credit."

The information was provided in each instance. You may have had similar situations arise in which you could have used our research department resources. Just drop us a line, we'll be glad to help or find the people who can.

LIGHTEN your inventories . . . BRIGHTEN your profits . . . WIDEN your markets . . . A Steel Service Center can help you achieve all three, so why not take a long, hard look at your steel buying policies. Maybe you can reduce inventories, increase profits and open up new markets by purchasing more steel as you need it, ready for production, from modern Steel Service Centers.

"We're saving $420,000 in inventory space!"

says Mr. Marvin H. Coleman, President, Conveyor Systems, Inc., Morton Grove, Ill.



This is hard-working production area. A small inventory keeps it that way.

Mr. John Drangine checking inventory. It's small, yet ample. Never overstocked!

"Today, we utilize only 6,000 square feet of space for our immediate steel needs," says Mr. Coleman. "But, if we were forced to stock all of our material requirements it would take at least 50,000 square feet of in-plant area.

"This would mean setting aside an additional 42,000 square feet. And, at the rate of $10.00 per square foot, it sums up to a dead space investment of $420,000, depreciated not in five or ten years, but over a twenty-year period. However, we've eliminated this problem by dealing with U.S. Steel Supply and getting prompt, efficient delivery of the steel we need . . . when we need it.

Why not take a close look at your steel buying policies—you'll find U.S. Steel Supply's pamphlet entitled "Value Analysis at Work" very helpful. Write to our Chicago Office, or call your nearest U.S. Steel Supply Steel Service Center. You'll find us in the Yellow Pages listed under *Steel*.

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U.S. Steel Supply Division of United States Steel

USS

Steel Service Centers and Complete Steel Strapping Service at: Baltimore, Birmingham, Boston, Chicago, Moline, Cleveland, Houston, Dallas, Los Angeles, Milwaukee, Newark, Southington (Conn.), Philadelphia, Seattle, Portland (Ore.), Pittsburgh, St. Louis, St. Paul, San Francisco.

General Offices: 208 South LaSalle Street, Chicago 4, Ill.

Name your load and speed combinations

We'll fit these bearings—or special types and sizes to your special needs.
Just fill in your application problem below—attach to your letterhead and mail.

THE SCHATZ MANUFACTURING COMPANY, Poughkeepsie, N. Y.
Here's our bearing problem. What do you suggest?

APPLICATION_____

LOAD (radial, thrust or both)_____

SIZE_____

SPEED_____

LIFE FACTOR_____

OPERATING CONDITIONS_____

SPECIAL CONDITIONS_____

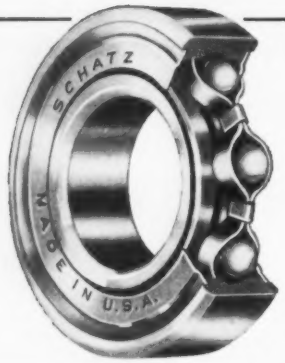
Name_____ Title_____

Company_____

Address_____

City_____ Zone_____ State_____

Schatz makes the most varied line of Ball Bearings to fit your needs



"Functional Precision" Ball Bearings—BR series

One piece race type with ball cage. Designed to give all the precision you require under certain ratios of load, speed and life expectancy. Available in open type, single or double shielded, single or double sealed with Schatz patented low friction plastic seal. Or with one shield and one seal on special order.

23 sizes from 3/16" to 1"—6 types in each size + specials

"Commercial" Ball Bearings—The most complete and varied line anywhere.

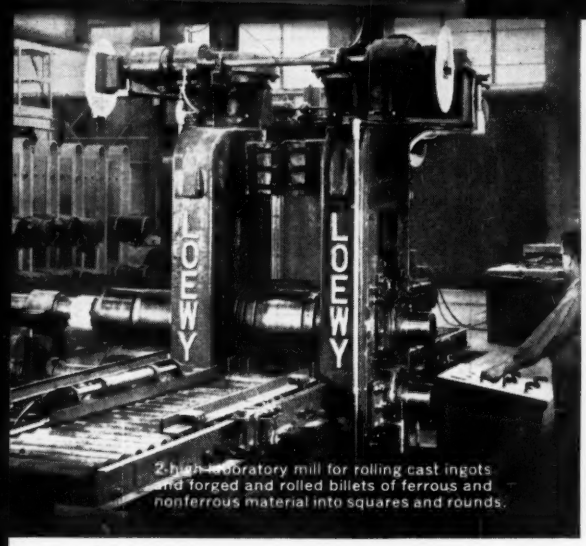
UNGROUND BALL BEARINGS "TYPE A"—Every standard type—radial, thrust and radial thrust.

GROUND BALL BEARINGS "TYPE B"—Used and recommended where greater accuracy and smoother running qualities are needed and where loads are heavier and speeds higher.

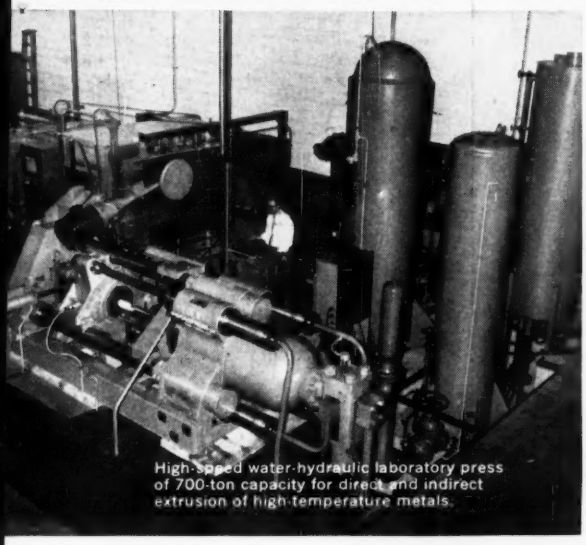
1033 sizes to match your Bearing Application Needs

SCHATZ
BALL BEARINGS

THE SCHATZ MANUFACTURING COMPANY • Poughkeepsie, New York



2-high laboratory mill for rolling cast ingots and forged and rolled billets of ferrous and nonferrous material into squares and rounds.


High-speed water-hydraulic laboratory press of 700-ton capacity for direct and indirect extrusion of high-temperature metals.

High-speed universal laboratory press of 500-ton capacity with hydraulic cushion. This press is designed for extrusion, drawing, forging and other forming operations.

Loewy laboratory presses and mills offer extraordinary flexibility

EXPERIMENTAL METALLURGY and pilot production with ferrous and nonferrous metals of unlimited variety, under trying and sometimes unknown conditions, demand presses and rolling mills of great flexibility. Consider these features of Loewy research equipment:

- Adaptability to a large variety of forming methods
- Wide range of speeds
- Ability to withstand sudden changes of temperature
- Provision for dealing with the heavy reductions and eccentric stresses caused by uneven shapes and contours
- Production to close tolerances, regardless of heat expansion and atmospheric conditions

All of those capabilities will be found in Loewy-Hydropress laboratory equipment for rolling, extruding, open forging, die-forging, compacting, drawing and rubber-pad forming. Many press-forming operations can sometimes be carried out on the same Loewy machine with but little adjustment.

Loewy specializes in such versatile forming tools for all types of low and high-carbon steels, high-temperature alloy steels, stainless steel, beryllium, zirconium, titanium and other light metals. While this equipment is designed basically for research and development, all features normally found on Loewy production machines can be incorporated.

Industrial and governmental laboratories, universities, foundations and atomic research centers turn to Loewy-Hydropress for metallurgical research equipment designed to their individual purposes.

For specific information or descriptive literature, write to Dept. B-9.

Loewy-Hydropress Division

BALDWIN · LIMA · HAMILTON

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BALDWIN BLH LIMA-HAMILTON

Smooth, quiet power transmission for heavy loads—

The Herringbone gear design provides continuous tooth action — eliminates end thrust.

Built for heavy load conditions, Horsburgh & Scott Herringbone Speed Reducers give you dependable economical service. They're available in single, double and triple reduction units. Check these 9 points of superiority:

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9. Splash lubrication floods all bearings and gears.

You'll find a wealth of information in our Catalog 55 describing our complete line of Speed Reducers. Write for it, or ask your nearby H & S representative.

THE HORSBURGH & SCOTT CO.
GEARS AND SPEED REDUCERS
5112 Hamilton Avenue
Cleveland 14, Ohio

CALENDAR
OF MEETINGS

Sept. 21-22, Steel Founders' Society of America: Fall meeting, Homestead Hotel, Hot Springs, Va. Society's address: 606 Terminal Tower, Cleveland 13, Ohio. Executive vice president: F. Kermit Donaldson.

Sept. 21-23, American Management Association: Personnel conference, Astor Hotel, New York. Association's address: 1515 Broadway, New York 36, N. Y.

Sept. 21-25, Instrument-Automation Conference & Exhibit: International Amphitheatre, Chicago. Sponsor: Instrument Society of America, 313 Sixth St., Pittsburgh 22, Pa. Executive director: William H. Kushnick.

Sept. 24-26, Porcelain Enamel Institute: Annual meeting, Greenbrier Hotel, White Sulphur Springs, W. Va. Institute's address: 1145 19th St. N. W., Washington, D. C. Managing director: John C. Oliver.

Sept. 27-30, American Institute of Chemical Engineers: Fall meeting, Hotel St. Paul, St. Paul, Minn. Institute's address: 25 W. 45th St., New York 36, N. Y. Secretary: F. J. Antwerpen.

Sept. 27-30, American Society of Mechanical Engineers and American Institute of Electrical Engineers: Muehlebach Hotel, Kansas City, Mo. Information: ASME, 29 W. 39th St., New York 18, N. Y. Secretary: O. B. Schier.

Sept. 28-29, American Management Society: Special marketing conference, Manhattan Hotel, New York. Society's address: 1515 Broadway, New York 36, N. Y.

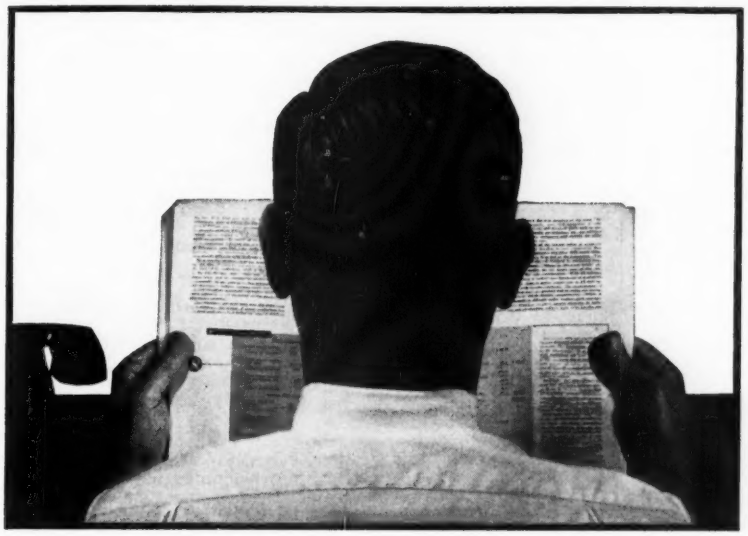
Sept. 28-Oct. 1, Association of Iron & Steel Engineers: Annual meeting and convention, Sherman Hotel, Chicago. Association's address: 1010 Empire Bldg., Pittsburgh 22, Pa. Managing director: T. J. Ess.

Sept. 28-Oct. 1, American Welding Society: National fall meeting, Sheraton-Cadillac Hotel, Detroit. Society's address: 33 W. 39th St., New York 18, N. Y. National secretary: Fred L. Plummer.

Oct. 4-7, National Association of Sheet Metal Distributors: Annual meeting, Atlantic City, N. J. Association's address: 1900 Arch St., Philadelphia 3, Pa. Executive secretary: Thomas A. Fernley Jr.

Oct. 5-7, Material Handling Institute Inc., Industrial Truck Association, Association of Lift Truck & Portable Elevator Manufacturers, Monorail Manufacturers Association: Joint fall meettings, Lake Placid Club, Essex County, N. Y. Information: Hanson & Shea Inc., 1 Gateway Center, Pittsburgh 22, Pa.

$1000 REWARD



For the capture of this man's ATTENTION

This is the opportunity you've been looking for—a chance to create a really effective businesspaper advertisement.

YOU CAN EARN $1000

To satisfy this long-time, deep-felt urge—and earn $1000 in the bargain—send us copy and a rough layout for *one* advertisement (any size, color or not, as you see fit). This ad should be capable of attracting the interested attention of industrial advertisers with a stake in the automation market. It should point up the values AUTOMATION magazine holds as a medium for reaching buyers of automatic production equipment.

MORE THAN ONE WINNER

This is not a one-winner contest. AUTOMATION will pay $1000 to the creator of each advertisement it decides subsequently to use as part of its advertising campaign. AUTOMATION editors will be the judges. Contestant's identity will remain anonymous during the judging.

FOR HELPFUL BACKGROUND INFORMATION

Pertinent information about AUTOMATION's market, readers and objectives for use in preparing your entry appears on the back of this page. If you desire additional material, please write and we will send you a booklet supplying complete details.

DEADLINE IS NOVEMBER 30, 1959

The competition is open to all. Anyone with a creative flair is urged to try his skill. Yours may be just the idea we're looking for. Send completed entries to $1000 Reward, c/o AUTOMATION, Penton Building, Cleveland 13, Ohio.

Background Information to Help You Win

$1000 REWARD

(For complete contest details, please see reverse side)

The Marketing Man's Stake in Automation

Automation is the marketing man's challenge today—and in the future. His ideas *must* match this manufacturing concept. The creative marketer realizes that as an absolute first condition, automation requires the establishment of a predictable, stable, and expanding market. Economic and sociological pressures force automation on us; automation forces new marketing concepts on us.

The building of a constant market will require a more complete circuit of communication. Now, the manufacturer-customer flow of information largely goes from the maker to the buyer. But with automation, we will have to know more about what the customer wants. Needed are improved ways to get better communication from maker to user and then back again.

The Management Man's Stake

Automation, or continuous automatic production, naturally will grow out of more complete mechanization. We have progressed from the manual area through the mechanization area and are now well into automation. Any discussion about whether automation is desirable is a futile intellectual exercise. We might as well argue whether the tides and the seasons are desirable.

The dawn of mechanization at the turn of the century brought a new era of lower costs and a higher standard of living than would have been possible in a manually operated economy. Now, we are approaching the upper limits of cost and labor reduction possibilities in a mechanically operated economy. We need a new breakthrough—and it will come through automation.

In the words of D. S. Harder, former Executive Vice President, Basic Manufacturing Divisions, Ford Motor Co.

> "Time has proved that the machine age is a boon—not a bugaboo . . . Manufacturers, large and small, have to make a choice. They can heed the warnings of uninformed doom prophets and retard our industrial progress—a road leading to oblivion. Or we can all have faith in ourselves and our ability to harness the potential of this new phase of industrialization for the benefit of all."

The Manufacturing Engineering Function

When industry first backed into automation without precision engineering, it had plenty of trouble. As a result, the manufacturing engineering function developed and has become industry's fastest growing and most important buying influence for automated production equipment.

Industry is changing from a departmentalized approach to a three-phase approach.

PHASE ONE—the processing or work-performing phase, which includes all the steps that alter or combine materials.

Phase Two—the handling phase, which encompasses the movement of materials in process within or between machines.

Phase Three—the control phase, covering the automatic cycling of functions 1 and 2—either independently or integrated.

How AUTOMATION Serves This Function

Edited for men with *manufacturing engineering* interests and responsibilities . . . AUTOMATION serves all industries. It reports and interprets all significant advancements and trends relating to automation, including planning, development, design, installation and maintenance. It provides for the exchange of ideas from one industry to another. This cross fertilization is the time-and-money saving link between those who have solved a production process problem and those who are still looking for a solution.

Why Users Read AUTOMATION

AUTOMATION is directed particularly to manufacturing engineering and operating management men in industry who are responsible for, or directly interested in, automation. Editorial and advertising pages provide the basis for their decisions concerning the adoption or improvement of automated equipment and manufacturing systems for their own use.

Why Designers and Builders Read It

In addition, AUTOMATION appeals to engineers and management men in companies that serve the special automation needs of industry . . . the manufacturing engineering function *to* industry. It gives designers and builders specific job help relating to all types of automated original production equipment . . . from single automatic machines to fully integrated lines and plants.

Reaches a $5 Billion Market

A continuing industry-wide study pinpoints the tremendous potential for Production Equipment, Handling Equipment, Power Drives and Automatic Control Equipment in this vast market controlled by the manufacturing engineering function. This "Survey Report and Automation Forecast" provides you with a new measure of marketing trends. Ask your AUTOMATION Representative to show you how to incorporate its data into *your* marketing plans.

Attracts a 90,000 Buyer Audience

AUTOMATION's vital readership is concentrated among 90,000 key buying influences . . . the manufacturing engineering and management men who specify, recommend, approve and buy your products. It reaches the important influences of the buying team . . . the men your salesmen don't always get a chance to contact and, yet, would *prefer* to contact.

High Response to Editorial

Written by manufacturing engineers for manufacturing engineers . . . AUTOMATION is geared to the exact needs and wants of its readers. Its editorial pages clearly communicate—create respect and response! This high level of reader interest is documented by reprint requests (averaging over 130,000 annually) and continually high Starch readership scores.

High Response to Advertising

Every advertisement in AUTOMATION is directed to the manufacturing engineering function, production-management men, or the designers of production equipment. No waste circulation . . . for every reader has the *need* to know about these products and the *power* to buy them.

Market Planning Help

You get more effective results from your advertising and help in reaching key automation-minded men in industry, too, with a complete marketing plan which includes: The Penton Census . . . the Continuing Industry-Wide Study of Automation . . . Reader Action Reports . . . Market Data Sheets . . . Starch Scores . . . plus many other Merchandising Aids. Your AUTOMATION Representative is prepared to help you make the most of industry's fastest growing and most influential function—*manufacturing engineering.*

Get ACTION from the men who buy and specify . . .

- *Production Equipment*
- *Handling Equipment*
- *Power Drives and Automatic Control Equipment*

AUTOMATION

A Penton Publication
Penton Bldg., Cleveland 13, Ohio

in the scrap yard,
in the furnaces,
on the finishing line

LINDE Oxygen is at work for Lukens Steel Company

Cutting metal to charging size, speeding steel making, scarfing hot slabs–from beginning to end of the steel making process LINDE Oxygen is busy at Lukens Steel Company . . . and has been for twenty-six years.

Lukens' just-completed "Phase A" Expansion calls for even busier oxygen. More scrap to cut, more furnaces to feed, more slabs to scarf–as production increases, the use of oxygen grows.

To keep pace with a growing Lukens Steel, a new LINDE on-site plant is now on stream at Coatesville, Pa. Capacity: 80,000,000 cubic feet per month.

LINDE Oxygen is no stranger at Lukens Steel. It's been at work there since 1933. In this quarter-century their oxygen requirements have grown from 100,000 cubic feet to present capacity.

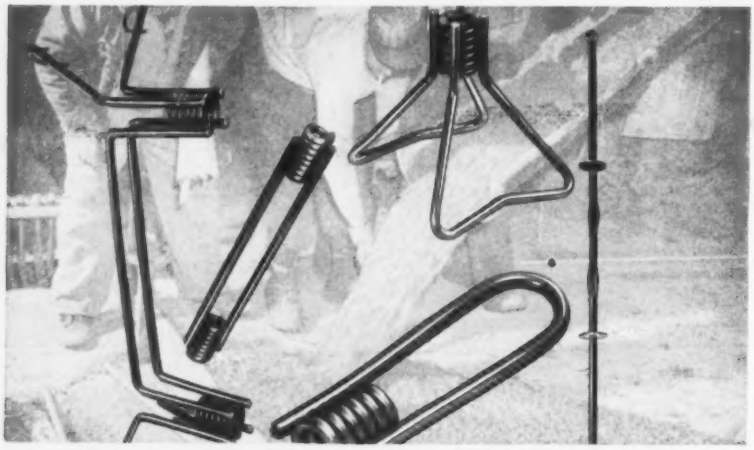
Every step of the way—from start to 1,500,000; then to 20,000,000 cubic feet; and now to 80,000,000—LINDE has supplied Lukens Steel with the exact amount of oxygen they needed, when they needed it.

If you would like more information on how LINDE Oxygen and supply systems can help you, write: Dept. SO94, Linde Company, Division of Union Carbide Corporation, 30 East 42nd Street, New York 17, New York. In Canada: Linde Company, Division of Union Carbide Canada Limited, Toronto.

Linde UNION CARBIDE

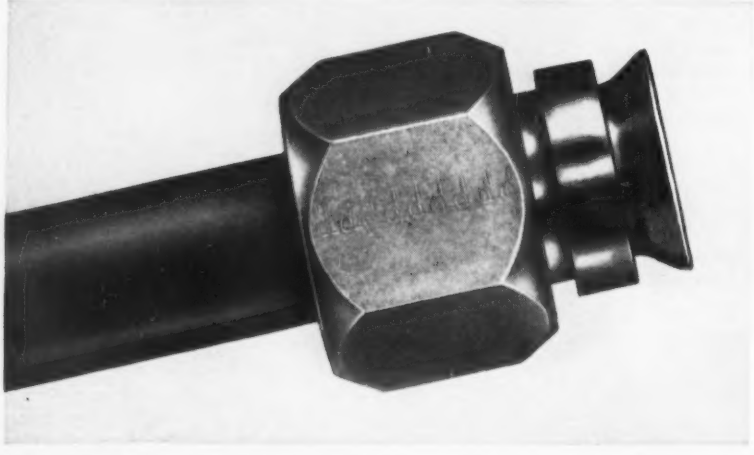
The term "Linde" is a registered trade-mark of Union Carbide Corporation.

Problem-solving ideas



ACCURATE, EASY FORMING . . . is yours with Republic Manufacturer's Coarse Wire in types and gages to meet almost any requirement. Illustrated are concrete reinforcing specialties fabricated by Superior Concrete Accessories, Inc., Franklin Park, Illinois. Uniform quality of Republic Steel Wire assures accurate, easy forming with adequate strength and toughness to meet the most difficult design and forming problems. Mail coupon for data.

UNIQUE TITANIUM SPEED BRAKE . . . brings Republic Aviation's F-105 fighter-bomber from *Mach* 2 to subsonic speeds quickly and with no appreciable loss of stability. Working closely with design engineers, Republic Steel supplied titanium products for the 360-degree speed brake. Hot formed, the titanium "petals" withstand searing 700-degree temperatures and the 90,000 psi impact accompanying brake extension at *Mach* 2.



YOU GET MORE TUBE PER DOLLAR . . . with Republic ELECTRUNITE® Hydraulic Fluid Line Tubing. Produced in all sizes shown in the *JIC Standards Book*. Available in an even wider range of sizes produced to our specification HL-1 (which meets all test requirements of the JIC Standard). Utmost uniformity assures better bending and flaring characteristics, appreciable savings in downtime. Send for complete ELECTRUNITE information, including a copy of specifications.

from Republic Steel...

Shown is the Baldwin-Lima-Hamilton model 2400 excavator being used as a drag line. Built by the Construction Equipment Division, Lima, Ohio, this heavy-duty excavator uses alloy steel in the vertical swing shaft (right), to assure maximum dependability under toughest conditions and work schedules.

ALLOY STEEL SWING SHAFT WITHSTANDS SEVERE STRAIN AND SHOCK

Baldwin-Lima-Hamilton excavators and cranes offer users the latest engineering and design advances. An outstanding example is the vertical swing shaft on the line's 6-cubic yard model shovels and 7-cubic yard draglines. Subject to severe strain and impact, the shaft is made from Type 4340 hot-rolled alloy steel, of which Republic is a major supplier.

On this highly critical shaft, rotate the cab and the boom. Use of 4340 alloy steel enabled Baldwin-Lima-Hamilton engineers to design a shaft of greatly increased strength while holding weight, envelope, and cost to a minimum. The alloy is delivered in 9-inch bars which are machined on one end and splined on the other. The spur pinion is an integral part of the shaft. A jaw clutch and 24-inch diameter "V" block swing brake are mounted on the shaft.

Like Baldwin-Lima-Hamilton, you can look to Republic for the *finest* in alloy steels . . . the *finest* in metallurgical and sales service. Republic Alloy Steels offer exceptionally high strength-to-weight ratios with the highest strength values. Uniform response to heat treatment assures hard, wear-resistant surfaces around tough cores.

Republic field metallurgists will work closely with your metallurgists and engineers. Famed 3-Dimension Metallurgical Teams—field, mill, and laboratory metallurgists—will help you select, apply, and process the right alloy steel for any application. For complete information without obligation, write today or mail the coupon.

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TO FIND THE MAN YOU NEED . . .

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The Metalworking Weekly

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When you're talking about a $162,000 dipper shovel, you've got to talk about the best rope for it

Talking about or working with, the same thing applies. Anything below Royal Blue's performance level is simply unrealistic. Like looking for a cut-price brain surgeon.

Even at $162,000, the cost of wire rope is important. That's why so-so ropes can cost you more in the long run, because so-so ropes are *short run*. Royal Blue, on the other hand, is built by America's oldest manufacturer of wire rope to last, to do the job without a whimper. Here's why.

Royal Blue is made from the toughest rope wire ever made—Type 1105—extra high-strength improved plow steel. This pedigree gives to the rope qualities that you can't find in any other rope: exceptional resistance to shock, abrasion, fatigue and impact. Add to these a flexibility that age cannot wither nor hustling fade and you've got a collection of characteristics that make Royal Blue the strongest rope you've ever used.

A $162,000 Dipper Shovel deserves the best and your Roebling Distributor has it . . . Royal Blue. For information, write to Roebling's Wire Rope Division, Trenton 2, N. J.

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Gained through countless fastener problems solved over the past 52 years means a greater ability to solve each new problem more quickly ... more economically. We're proud of this accumulated "know-how" because it assures our customers of highest quality standard and special fasteners.
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Cold upset screw products
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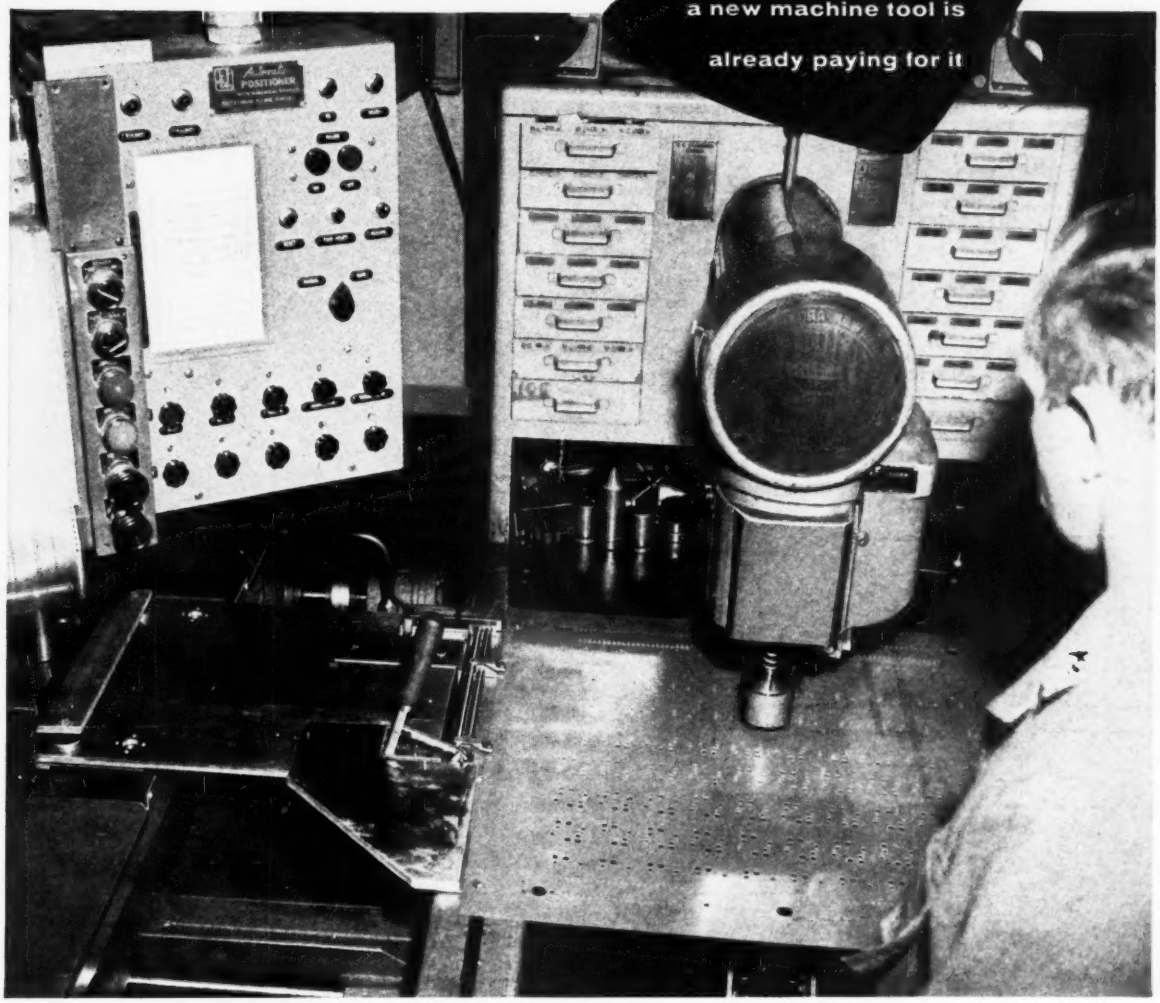
the man who needs a new machine tool is already paying for it



This Tape Controlled Setup Punches 1483 holes – of 11 different sizes – in just 85 minutes

How's this for small lot automation? The problem is to produce 50 parts, each having 1483 holes of 11 different sizes. Hole location must be ±.002". Delivery — 2 weeks.

J & L's numerical control positioning table, applied to a standard punch press, does the job with minimum lead time, production time, and cost. Here's how:

The entire tape programming for this complicated part takes only 15 hrs. There are no fixtures, templates, or dogs to be made and set. No gang tooling to prepare. No appreciable setup time.

The operator simply inserts the prepared tape, locates the work piece and pushes a button. The positioning table is then automatically controlled in any pre-arranged, random pattern. Therefore there are only 11 tool changes for the 11 sizes of holes. And — this unit tells the operator when and what tool to change.

A completed part comes off the machine every 85 minutes. Changeover for other jobs is just a matter of changing tapes and tools.

Investigate how tape control can help increase the efficiency of *your* operation. Write to Jones & Lamson Machine Company, 517 Clinton Street, Springfield, Vermont.

Turret Lathes • Automatic Lathes • Tape Controlled Machines • Thread & Form Grinders • Optical Comparators • Thread Tools

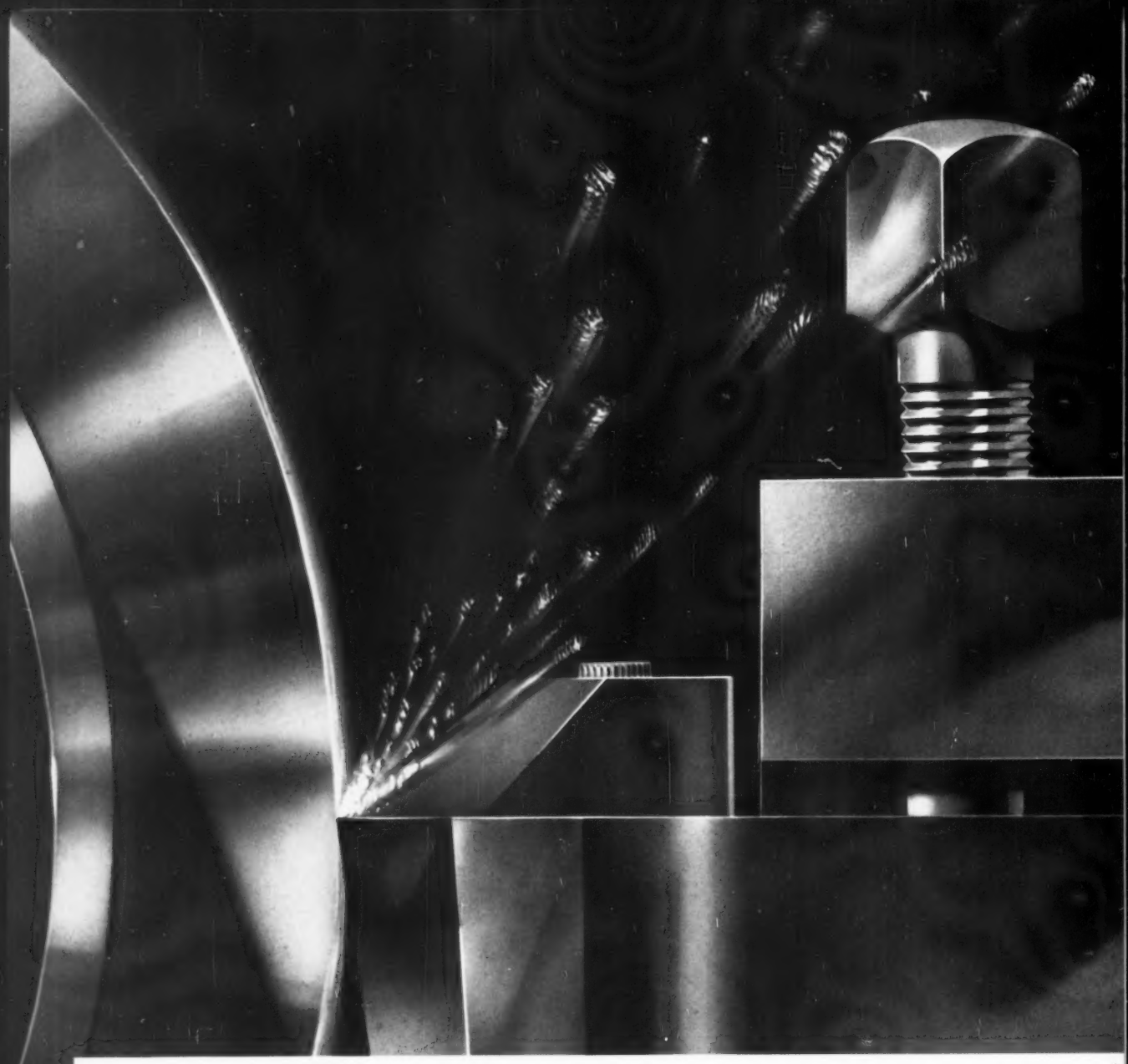


Illustration of Malleable casting being turned at 1,400 surface feet per minute with a 0.100" depth of cut using an oxide tool.

Machinability is Malleable

It's the finished cost of machined components that's important to you. Remember then . . . Malleable iron is more machinable than any other ferrous metal of similar properties. With Malleable castings you'll reduce machining time as much as 50% . . . increase tool life up to 250% . . . get unexcelled surface finishes . . . and end your reject problems.

To find out how much you can cut your costs and improve your profits, contact one of the progressive firms that displays this symbol—

MEMBER

MALLEABLE

CASTINGS COUNCIL

If you wish, you may inquire direct to the Malleable Castings Council, Union Commerce Building, Cleveland 14, Ohio, for information.

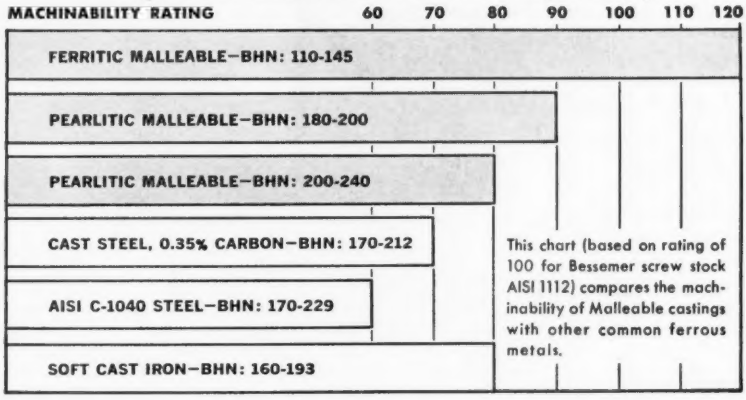
Machining Malleable Castings—Important Key to Cost Reduction

Malleable castings—the most machinable of all ferrous metals—cut quality components costs

Production men know that machining time, power consumption and rejects drop with the use of Malleable iron castings, while tool life and profits shoot up. The reason is simple: Malleable iron is the most machinable of all ferrous metals of similar properties.

The following important factors work together to give Malleable such machining superiority: Malleable's microstructure contains tiny, evenly distributed nodules of carbon that help cutting tools quickly break the removed metal into small (Class A) chips; the carbon also acts as a lubricant, prolonging tool life; uniformity of properties throughout every casting permits running at optimum machining conditions.

Comparison Shows Malleable's Superiority



Typical Example Shows Savings of 70% to 250%

The conversion of automotive universal joint yokes from steel forgings to pearlitic Malleable castings typifies the savings provided by Malleable castings. Costs for the rough pieces and performance characteristics of the two materials are comparable. However, the castings are much more economical to machine. Considering that machining often costs two to four times as much as the rough parts, the economy resulting from using Malleable castings is substantial.

Conversion of this universal joint yoke to a Malleable casting increased production, lowered direct and tool room labor, and cut tool replacement.

One volume user of Malleable joint yokes reports the following savings after changing from steel to Malleable castings: 70% longer tool life in broaching the splines; 250% more pieces cut by the nut seat cutters; 149% more pieces in turning and facing the hub; an increase of 100% in production between wheel dressings in grinding the hub; 246% greater production in drilling the cross holes.

In each of these operations, the change to Malleable castings cuts direct production time by reducing the frequency of tool changes. Tool room labor and tool replacement are both reduced to fractions of their previous costs.

Throughout the metalworking industry, part after part is now being initially designed of Malleable or converted from other materials to take advantage of Malleable's unrivalled machinability . . . to produce better parts at lower costs.

New Information Now Available on Machining Malleable

Data Unit 106—Machinability of Malleable Castings—can be obtained from any member of the Malleable Castings Council, or from the Malleable Castings Council, Union Commerce Building, Cleveland 14, Ohio.

These companies are members of the

MALLEABLE CASTINGS COUNCIL

CONNECTICUT
Connecticut Mall. Castings Co., New Haven 6
Eastern Malleable Iron Co., Naugatuck
New Haven Malleable Iron Co., New Haven 4

DELAWARE
Eastern Malleable Iron Co., Wilmington 99

ILLINOIS
Central Fdry. Div., Gen. Motors, Danville
Chicago Malleable Castings Co., Chicago 43
Moline Malleable Iron Co., St. Charles
National Mall. and Steel Castings Co., Cicero 50
Peoria Malleable Castings Co., Peoria 1
Wagner Castings Company, Decatur

INDIANA
Link-Belt Company, Indianapolis 6
Muncie Malleable Foundry Co., Muncie
Terre Haute Mall. & Mfg. Corp., Terre Haute

MASSACHUSETTS
Belcher Malleable Iron Co., Easton

MICHIGAN
Albion Malleable Iron Co., Albion
Auto Specialties Mfg. Co., Saint Joseph
Cadillac Malleable Iron Co., Cadillac
Central Fdry. Div., Gen. Motors, Saginaw

MINNESOTA
Northern Malleable Iron Co., St. Paul 6

NEW HAMPSHIRE
Laconia Malleable Iron Co., Laconia

NEW JERSEY
Meeker Foundry Company, Newark 4

NEW YORK
Acme Steel & Mall. Iron Works, Buffalo 7
Frazer & Jones Company Division Eastern Malleable Iron Co., Solvay
Oriskany Malleable Iron Co., Inc., Oriskany
Westmoreland Mall. Iron Co., Westmoreland

OHIO
American Malleable Castings Co., Marion
Canton Malleable Iron Co., Canton 5
Central Fdry. Div., Gen. Motors, Defiance
Dayton Mall. Iron Co., Ironton Div., Ironton
Dayton Mall. Iron Co., Ohio Mall. Div., Columbus 16
Maumee Malleable Castings Co., Toledo 5
National Mall. and Steel Castings Co., Cleveland 6

PENNSYLVANIA
Buck Iron Company, Inc., Philadelphia 22
Erie Malleable Iron Co., Erie
Lancaster Malleable Castings Co., Lancaster
Lehigh Foundries Company, Easton
Meadville Malleable Iron Co., Meadville
Pennsylvania Malleable Iron Corp., Lancaster

TEXAS
Texas Foundries, Inc., Lufkin

WEST VIRGINIA
West Virginia Mall. Iron Co., Point Pleasant

WISCONSIN
Badger Malleable & Mfg. Co., S. Milwaukee
Belle City Malleable Iron Co., Racine
Chain Belt Company, Milwaukee 1
Federal Malleable Company, West Allis 14
Kirsh Foundry Inc., Beaver Dam
Lakeside Malleable Castings Co., Racine
Milwaukee Malleable & Grey Iron Works, Milwaukee 46

NOW

"COLD-POINT" DRILLING!

of Super-Hard Metals, Glass or Ceramics with "Buffalo" Hollow Spindle Drill. Speeds to 10,000 RPM!

Now you can buy a production drilling machine especially designed to deliver the high speeds and forced coolant flow necessary with the new hollow core cold-point drill, and diamond impregnated bits.

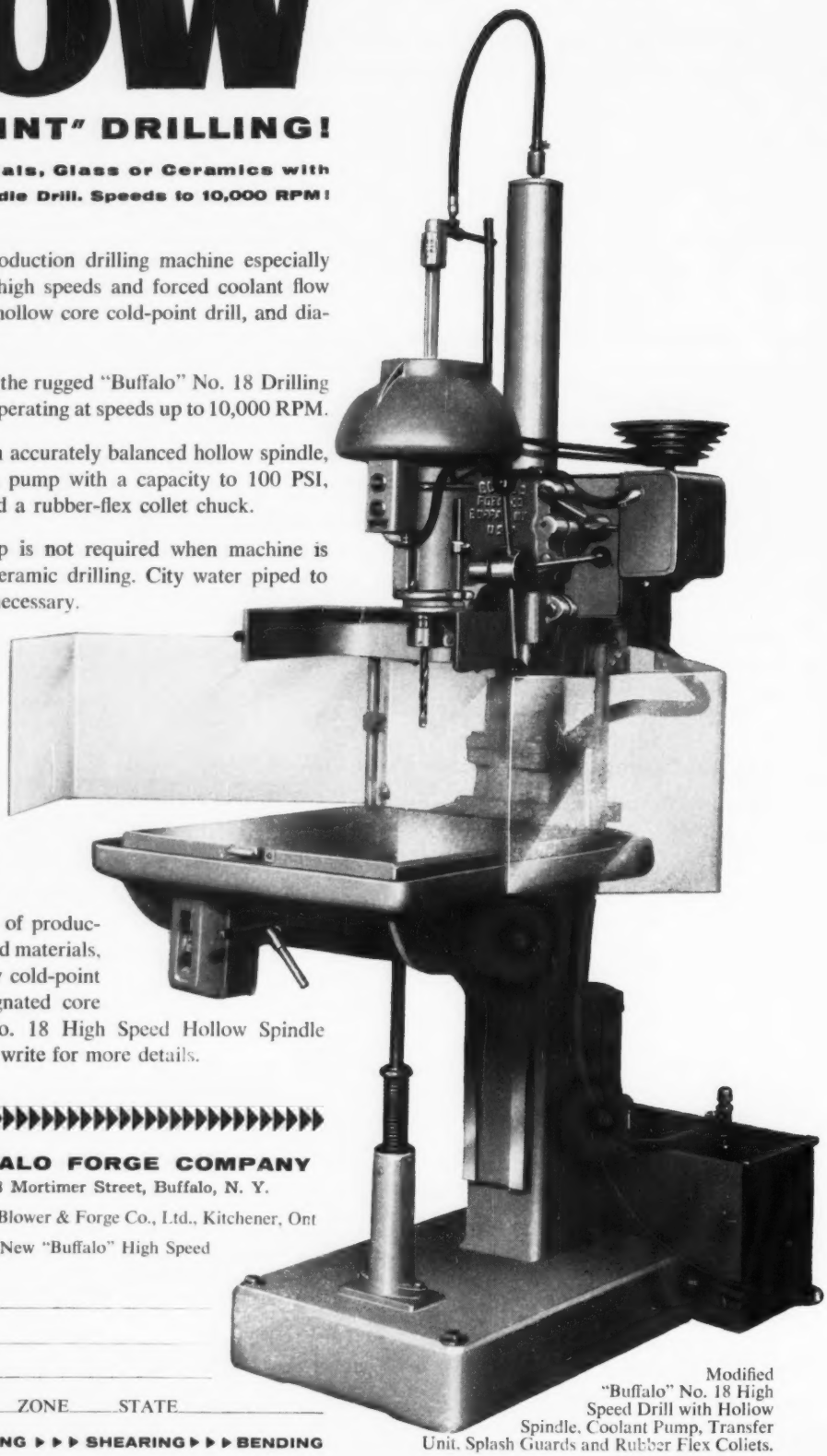
This modified version of the rugged "Buffalo" No. 18 Drilling Machine is successfully operating at speeds up to 10,000 RPM.

Modifications include: an accurately balanced hollow spindle, coolant system having a pump with a capacity to 100 PSI, special splash guards and a rubber-flex collet chuck.

The high pressure pump is not required when machine is used only for glass or ceramic drilling. City water piped to the spindle is all that is necessary.

It is possible to handle heretofore impossible drilling jobs at production speeds and regular drilling can be done much faster. In many cases reaming or finishing can be eliminated because of the fine quality of the drilled hole.

If you have the problem of producing holes in extremely hard materials, you need the new hollow cold-point drill or diamond impregnated core bits and a "Buffalo" No. 18 High Speed Hollow Spindle Drill. Use the coupon or write for more details.



Modified "Buffalo" No. 18 High Speed Drill with Hollow Spindle, Coolant Pump, Transfer Unit, Splash Guards and Rubber Flex Collets.

BUFFALO FORGE COMPANY
158 Mortimer Street, Buffalo, N. Y.
Canadian Blower & Forge Co., Ltd., Kitchener, Ont

Please send me details on New "Buffalo" High Speed Drilling Machine:

NAME_____

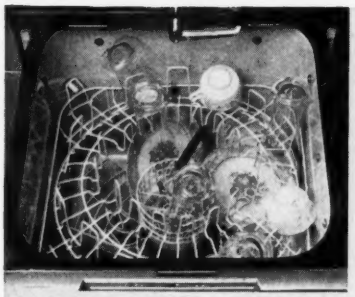
COMPANY_____

STREET ADDRESS_____

CITY_____ ZONE____ STATE_____

DRILLING ▸▸▸ PUNCHING ▸▸▸ SHEARING ▸▸▸ BENDING

NEW WAY TO UPGRADE YOUR PRODUCTS: VINYL COATINGS



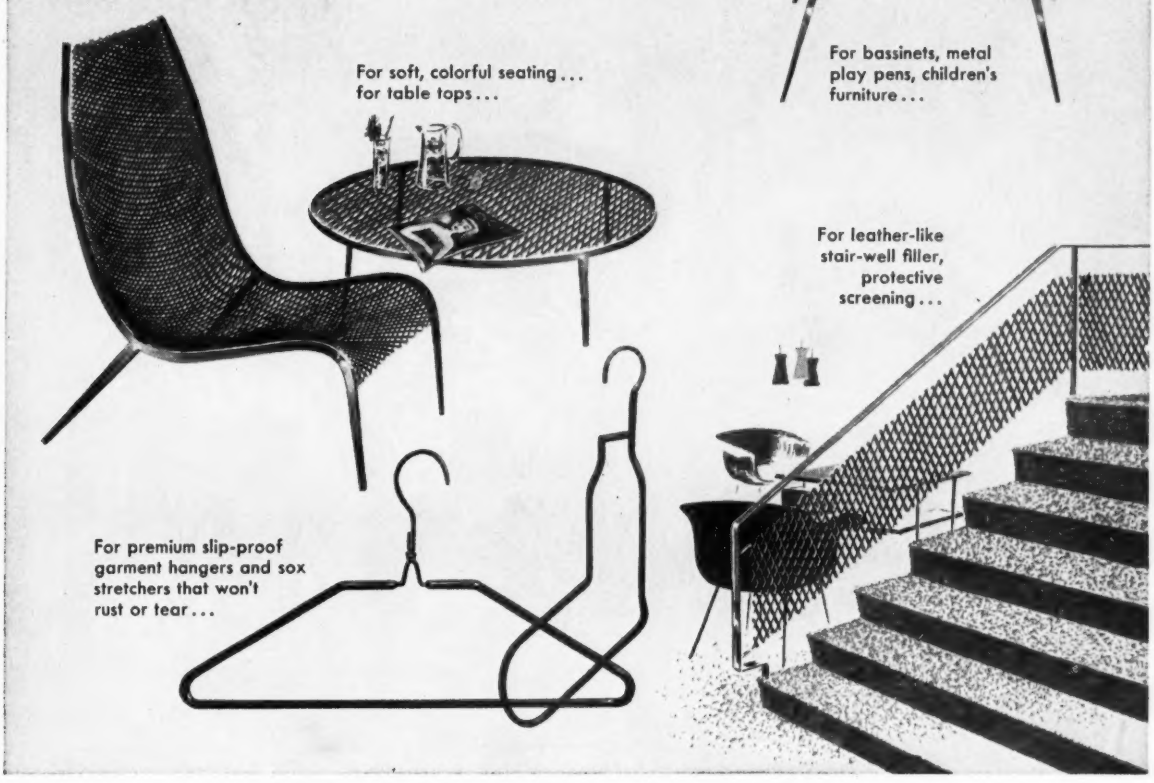
This lustrous vinyl-coated rack resists the scalding water and detergents of automatic dishwashing, prevents clattering and chipping of delicate china.

For bassinets, metal play pens, children's furniture...

For soft, colorful seating... for table tops...

For premium slip-proof garment hangers and sox stretchers that won't rust or tear...

For leather-like stair-well filler, protective screening...



Colorful, leathery coatings for wire and expanded steel

Tough leather-like coatings of vinyl can create profitable new markets for you with wire and expanded steel products. Colorful coatings up to 1/16" (60 mils) thick can be deposited on heavy wire, rod stock, or expanded steel in *one dip*. Or by *spraying* it on.

You can make the elastomeric coatings soft and rubbery—or as hard as tire casing. Make the finishes glossy, matte, or even *crinkled*. And in any color you choose. The characteristics of the final coating are determined by the formulation. After spray or dip application, a short heat cure "sets" the resin and permanently bonds it to the metal.

Write for sources of vinyl in liquid form for coating metal, glass, or wood. Get a head start on investigating the new, profitable ways to use wire and expanded steel—vinyl coated for resilience, color and premium appearance. Write today!

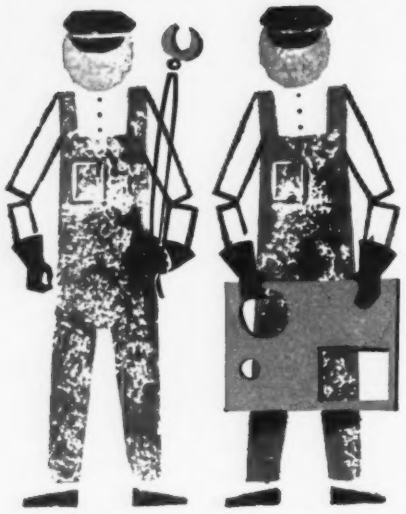
Organic Chemicals Division
MONSANTO CHEMICAL COMPANY
Dept. SP-1, St. Louis 66, Missouri

Monsanto manufactures a wide variety of plasticizers and Opalon® resins for formulators of these high-quality vinyl dispersions.

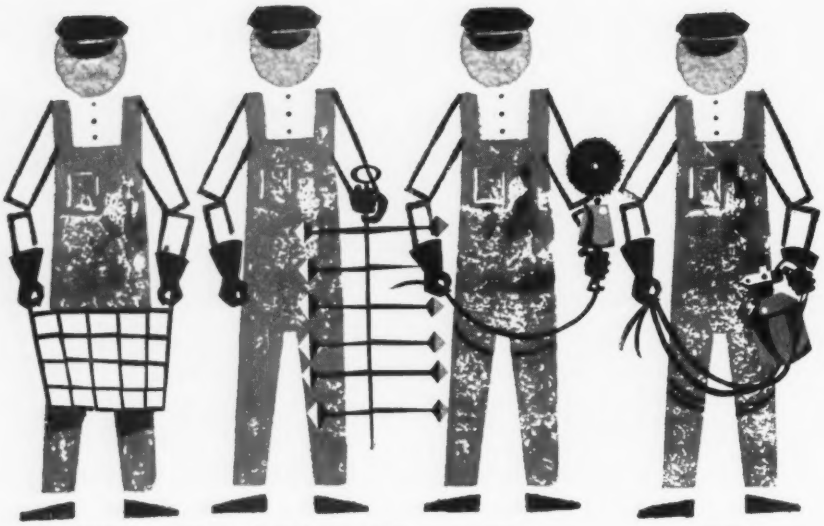
Monsanto®

Where Creative Chemistry Works Wonders for You

ALL UNDER ONE ROOF AT BROWN-LIPE-CHAPIN



DIE CASTING METAL STAMPING



ANODIZING NEW DURA-PLATE ELECTROPLATING POLISHING PAINTING

Everything's done on virtually one continuous assembly line—from die casting or metal stamping to the gleaming finished part.

Every process is under one roof: Extensive facilities for precision die casting parts of any shape and sizes up to six feet in length . . . an array of presses for stamping parts of any metal . . . complete facilities for rolled sections . . . and efficient assembly line processes for polishing, anodizing, painting and electroplating with new Dura-Plate.

Two plants, strategically located in Syracuse, New York and Elyria, Ohio, offer the same complete, under-one-roof facilities to speed delivery of your parts to meet your schedules right on time. So whatever your product, write or phone Brown-Lipe-Chapin, Syracuse, New York for prompt information.

GM GENERAL MOTORS RELIABILITY by BROWN·LIPE·CHAPIN BLC

DIVISION OF GENERAL MOTORS CORPORATION

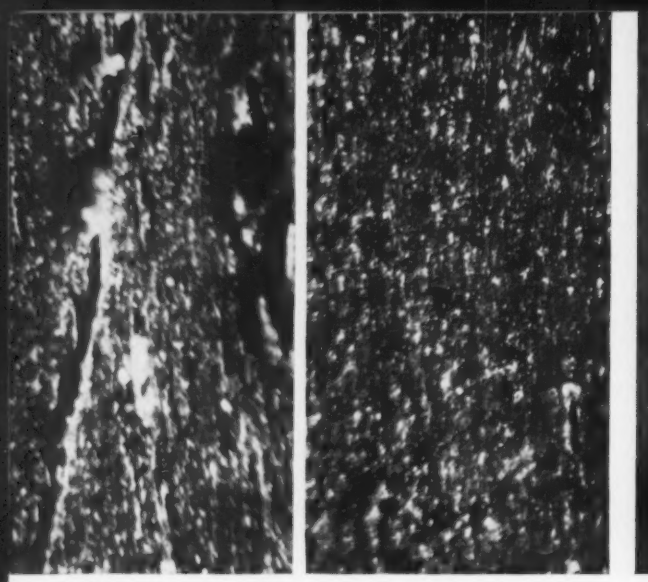
A BRAND-NEW PLANT FOR MAKING HIGH-VOLTAGE RUBBER-INSULATED CABLE... WHY ANACONDA BUILT IT... WHAT IT MEANS TO YOU

Butyl is the most effective rubber insulation yet developed—either natural or synthetic—for high-voltage cable. It has inherent resistance to aging, to moisture, to heat, and most important in high-voltage cable—to ozone.

But—butyl handles differently from other rubbers. And so it demands specialized engineering knowledge, highly specialized equipment, techniques, and precision control at every manufacturing step.

That briefly is why Anaconda built this huge plant at Marion, Indiana—to combine under one big roof the specialists and the specialized equipment needed to make the finest rubber-insulated cable available to you.

Turn the page to see how Anaconda Butyl (AB) Cable was developed and is manufactured. See how each step helps make a better cable for you.



Above you see magnified sections of ordinary cable insulation (left) and Anaconda Butyl (AB) Cable insulation (right).

These screens, used in the extrusion head to entrap possible contaminants, are so fine they actually hold water.

TWO BIG REASONS WHY ANACONDA BUTYL (AB)

1. SPECIALIZED DEVELOPMENT

Because Anaconda was the first to develop butyl-insulated cable—and because butyl handles differently from other rubbers—many problems came up during development. Here are some examples—and how Anaconda engineers solved them.

A mixing problem: Like all raw rubbers, butyl in its raw state is a practically useless material. So it's mixed with specially selected additives and ingredients. Because it is very difficult to disperse these ingredients in butyl, Anaconda had to develop an entirely new mixing process and separate facilities to avoid contamination. Look at the comparison photos and see how successful it is.

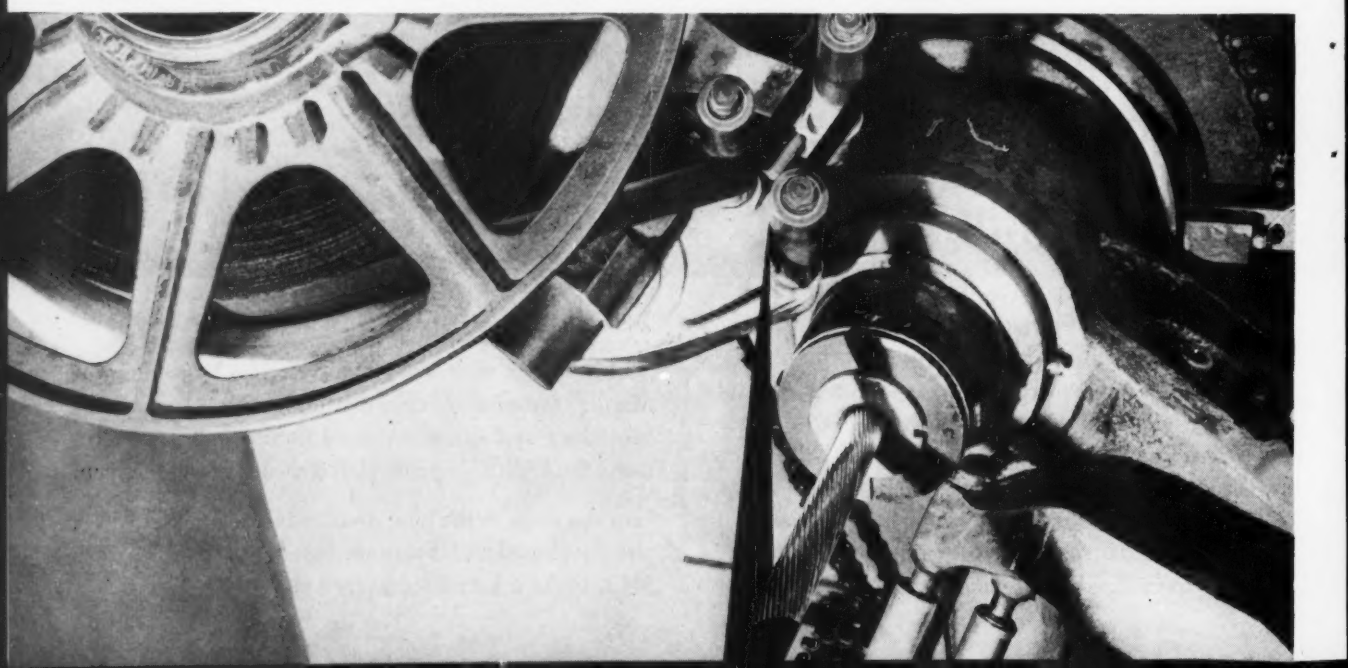
A shielding problem: To eliminate laborious and time-consuming cleaning of insulation surfaces, Anaconda developed a semiconducting tape* which firmly adheres to the insulation—and yet is easy to remove during splicing and terminating.

Even a vulcanizing problem: Ordinary vulcanizing equipment might have a tendency to deform butyl insulation. So Anaconda developed huge vulcanizing tanks which admit steam faster, vulcanize quicker and eliminate distortion.

These few examples show you the types of problems Anaconda engineers were up against. Their solutions help show you why you can be sure Anaconda Butyl (AB) Cable is the finest cable you can buy.

*Pat. applied for

Close-up of semiconducting strand-shielding tape being applied to 500-Mcm tinned copper conductor.



An Anaconda development—semiconducting tape—adheres firmly to insulation, yet removes easily, facilitating splicing and terminating.

MEANS RELIABLE HIGH-VOLTAGE CABLE

2. SPECIALIZED MANUFACTURE

Anaconda's new Marion Mill was designed to handle only one product—Anaconda Butyl (AB) Cable.

The men behind this highly specialized equipment have but one job . . . to study and improve the design and manufacture of rubber-insulated high-voltage cable. Here are a few of the many places where they built precision right into the production line.

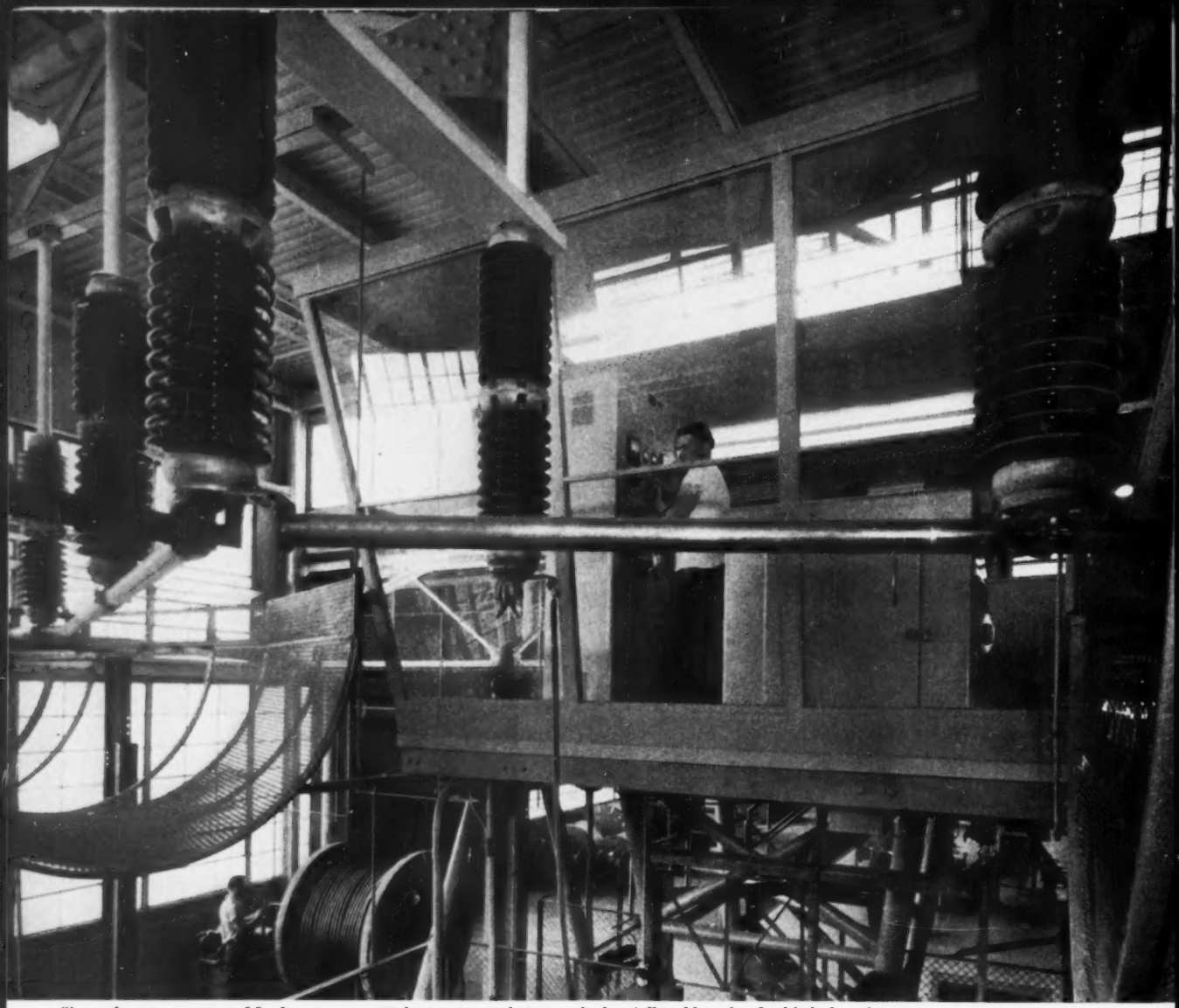
Insulation purity: For extra protection against contamination, the unvulcanized Anaconda Butyl is passed through a series of screens, one of which is so fine it will hold water.

Strand-shield taping: For better equalization of internal electrical stress, Anaconda applies a special fine-mesh semiconducting tape under the insulation of all stranded high-voltage cables.

Vulcanizing in lead: Conventional lead presses must stop periodically for refilling—severely heating up and often damaging the cable section in the die block, so Anaconda extrudes lead continuously. In the next step, exceptionally large drums are used for vulcanizing in lead to eliminate distortion of jackets and insulation.

These few examples help show you that the manufacture of Anaconda Butyl (AB) is highly specialized, highly precise—and why Anaconda offers you the big advantage of consistent high quality.

Huge reel entering large vulcanizing tank which vulcanizes cable quicker than conventional methods, eliminating distortion of insulation.



Shown here is a section of final testing area. Voltage tests are being applied to *full reel lengths* of cable before shipment.

ANOTHER BIG REASON WHY YOU SHOULD CONSIDER ANACONDA BUTYL (AB) CABLE—

SPECIALIZED QUALITY CONTROL AND INSPECTION

From the start: Raw-material suppliers are required to submit certified test reports. Then, too, tests and sampling at our plant offer extra protection even before production begins.

To finish: Here's the final inspection line where the finishing touches are applied and where every inch of cable is carefully inspected. Perhaps you already know that Anaconda test procedures are much above industry standards. But do you know that test voltages on Anaconda Butyl (AB) Cable are 125% of industry standards—that minimum corona level is 150% of rated voltage to ground?

Quality control at Anaconda is *more* than mere testing and inspection. It is built into every manufacturing step. That's why you can be sure your Anaconda cable will be of high quality—why you can be sure Anaconda Butyl (AB) Cable is the finest rubber-insulated cable you can buy.

Everything you need to know about Anaconda Butyl (AB) high-voltage cable is neatly summed up in a new booklet, DM-5903, "Anaconda High-Voltage Durasheath* Cable." Write for your copy today.

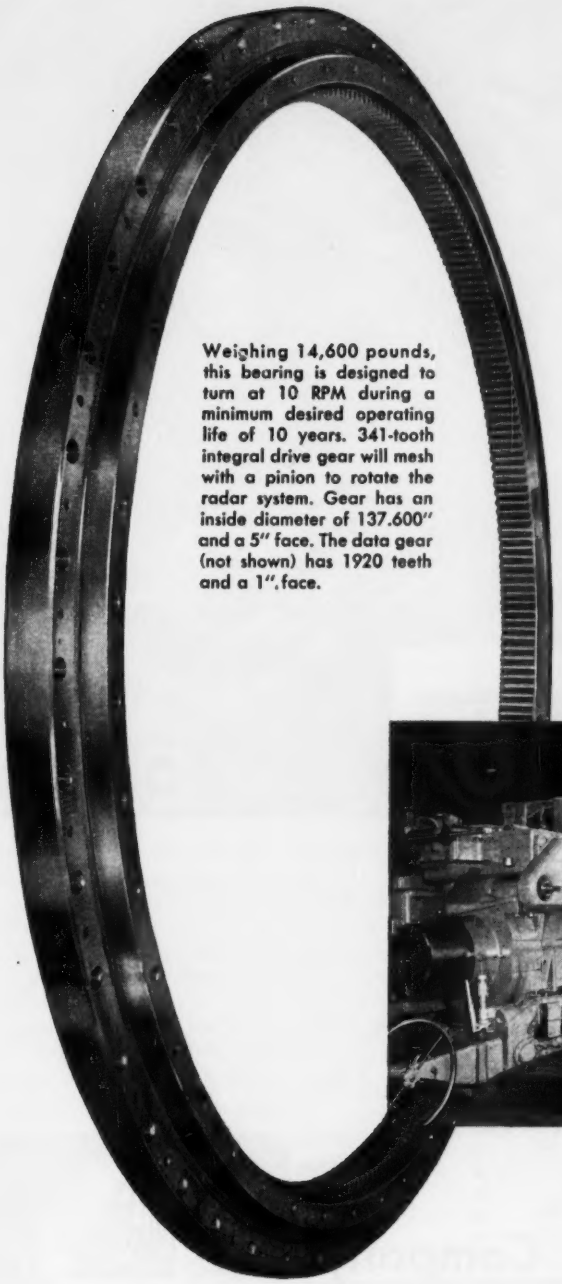
*Reg. U.S. Pat. Off. 59256

ASK THE MAN FROM

ANACONDA®

ABOUT BUTYL (AB) HIGH-VOLTAGE CABLE

Huge bearing for Nike-Zeus radar system incorporates Farrel® precision internal gears



Weighing 14,600 pounds, this bearing is designed to turn at 10 RPM during a minimum desired operating life of 10 years. 341-tooth integral drive gear will mesh with a pinion to rotate the radar system. Gear has an inside diameter of 137.600" and a 5" face. The data gear (not shown) has 1920 teeth and a 1" face.

The largest precision ball bearing ever fabricated—13'9" in diameter, with 88 four-inch balls—has recently been completed by the Kaydon Engineering Corp. Designed to carry a rotating dead weight of up to one million pounds, it will be used in the supporting pedestal of a Nike-Zeus radar system.

Drive and data gears were cut by Farrel to very close tolerances. These were made integral with the bearing to eliminate the accumulative errors inherent when a number of parts are pieced together, and to simplify the design.

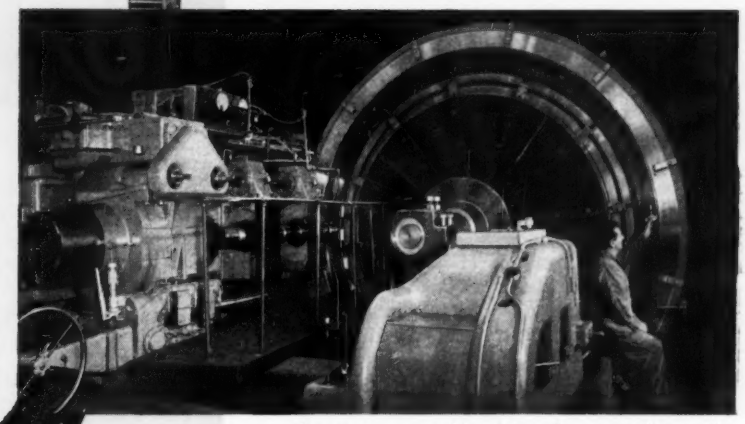
The Farrel generator on which the gears were cut combines the capacity to handle work of such proportions with the precision demanded for this application. Farrel internal gears are available with spur or single-helical teeth in sizes up to 23'0" external blank diameter, 20" face, ¾ DP.

Ask for details of large gears to meet your requirements.

FARREL-BIRMINGHAM COMPANY, INC.
ANSONIA, CONNECTICUT

Plants: Ansonia & Derby, Conn., Buffalo & Rochester, N. Y.
Sales Offices: Ansonia, Buffalo, Akron, Ann Arbor (Mich.), Chicago, Minneapolis, Los Angeles, Salt Lake City, Tulsa, Houston, Atlanta
European Office: Piazza della Republica 32, Milano, Italy

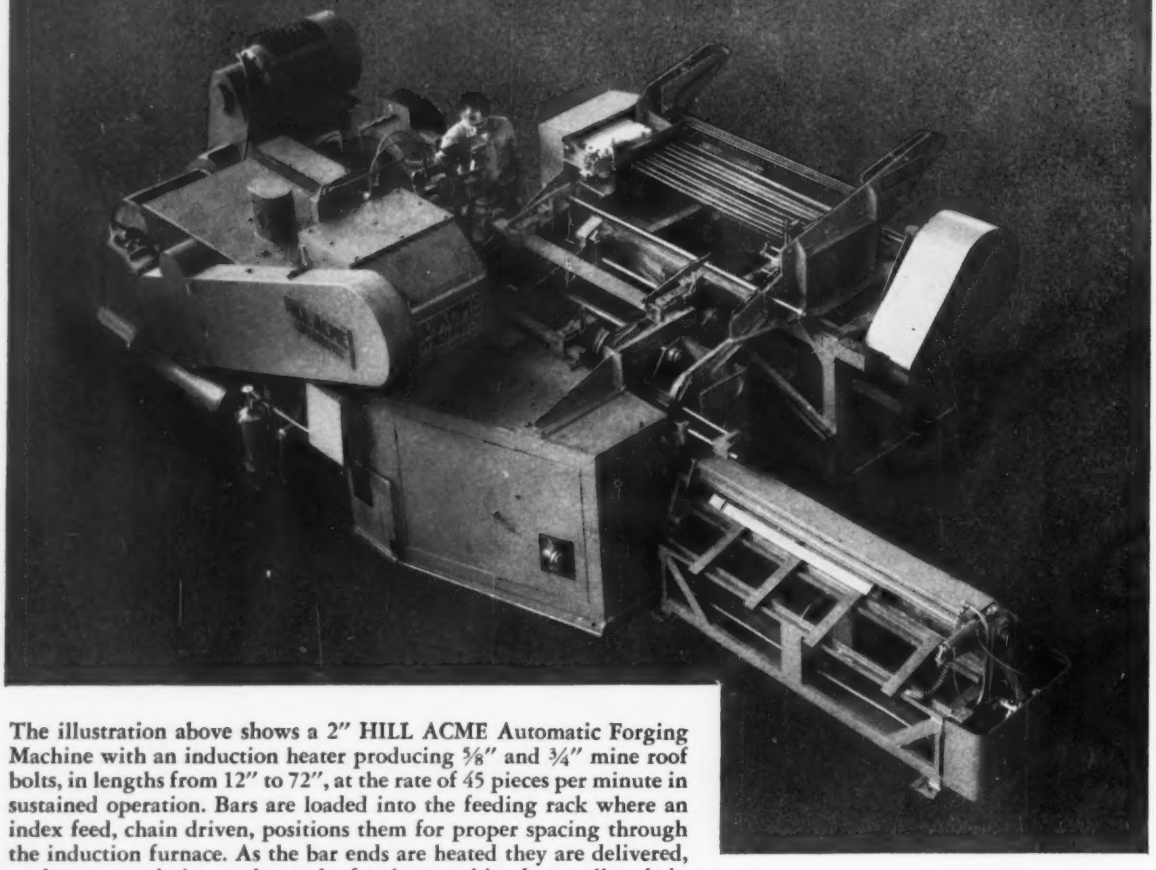
FARREL®



Generating a precision internal gear, similar to the one supplied to Kaydon in a Farrel gear generator.

FB-1172

Fully Automatic
FORGING MACHINE
DELIVERS 45 PIECES PER MINUTE!



The illustration above shows a 2" HILL ACME Automatic Forging Machine with an induction heater producing 5/8" and 3/4" mine roof bolts, in lengths from 12" to 72", at the rate of 45 pieces per minute in sustained operation. Bars are loaded into the feeding rack where an index feed, chain driven, positions them for proper spacing through the induction furnace. As the bar ends are heated they are delivered, at the proper timing cycle, to the forging machine by a roller chain feed where they are gauged for length, picked up by fingers and passed progressively through the dies. Finished forgings are discharged from the back of the machine by means of a separately driven conveyor, arranged for both right and left hand discharge.

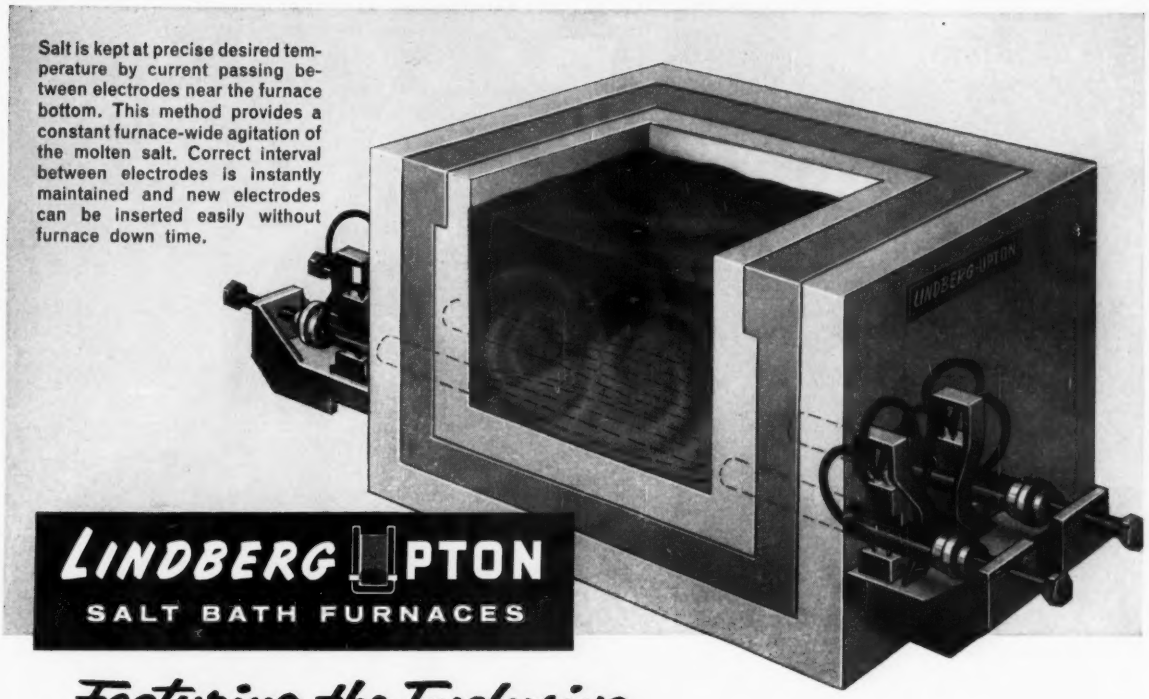
The design of this new HILL ACME AUTOMATIC forging unit does not limit the number of passes or the length of stock to be used in forging a variety of parts. Pieces longer than 36" are supported by a walking beam through the various passes.

HILL ACME AUTOMATIC forging machines are built in 1¼" to 5" capacities all of which can be automated. Your inquiry concerning high speed automatic forging equipment will receive prompt attention.

The HILL ACME Company

1207 W. 65th STREET • CLEVELAND 2, OHIO

Manufacturers of: "ACME" FORGING • TAPPING MACHINES • "CANTON" ALLIGATOR SHEARS • ROTARY SHEARS • BAR-BILLET SHEARS • "HILL" GRINDING AND POLISHING MACHINES • HYDRAULIC SURFACE GRINDERS • "CLEVELAND" KNIVES • SHEAR BLADES • MATERIAL HANDLING EQUIPMENT


Salt is kept at precise desired temperature by current passing between electrodes near the furnace bottom. This method provides a constant furnace-wide agitation of the molten salt. Correct interval between electrodes is instantly maintained and new electrodes can be inserted easily without furnace down time.
LINDBERG UPTON
SALT BATH FURNACES

Featuring the Exclusive

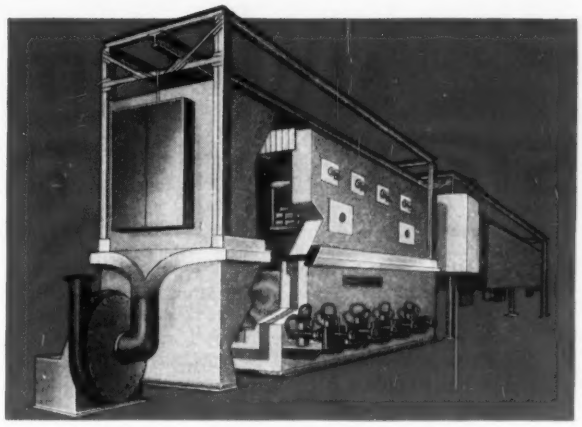
Graphite "Continuing" Electrode

MORE EFFICIENT, MORE ECONOMICAL FOR ALUMINUM DIP BRAZING

With Lindberg-Upton's graphite "continuing" electrodes you can eliminate problems inherent in ordinary high alloy electrodes for aluminum dip brazing. An exclusive feature of Lindberg-Upton Salt Bath Furnaces, these graphite electrodes also provide a superior technique for treating high speed steels and super alloys requiring extremely deep furnaces and high temperatures up to 2500° F. Here are some of their advantages:

- **No flux contamination as with alloy electrodes.**
- **No electrode replacement down time—"continuing" electrode is easily advanced as needed.**
- **Low cost—approximately $0.25 per electrode per month in aluminum dip brazing applications.**
- **Unique starting coil makes this the easiest electrode furnace to start or restart.**
- **Temperature uniformity within ± 2½° F.**
- **Unobstructed top surface area.**
- **Pot area unobstructed for fast, easy cleaning.**
- **Monolithic walls—less than 8% salt absorption.**
- **Sizes up to 50′ or more in length.**

Your local Lindberg Field Representative (see your classified phone book) will explain how Lindberg-Upton furnaces can help you. Or write us direct. Salt Bath Furnace Division, Lindberg Engineering Company, 2441 West Hubbard Street, Chicago 12, Illinois. Los Angeles plant: 11937 South Regentview Avenue, at Downey, California. In Canada: Efco-Lindberg, Ltd., Toronto.



A complete Lindberg installation—preheat furnace at right, holding chamber at top left. Lindberg-Upton Salt Bath Furnace with graphite "continuing" electrodes below at left. Necessary wash tanks (not shown) were included in the final installation.

When you select Lindberg-Upton Salt Bath Furnaces you have the additional advantage of dealing with one responsible source, Lindberg, for all necessary industrial heating equipment needed to fit your production processes effectively. Here is a cut-out view of a complete salt bath installation engineered and field-installed by Lindberg Industrial Division. Single responsibility for the efficient operation of the complete unit is your best guarantee of full satisfaction.

LINDBERG heat for industry

use Airco's new Dip Transfer† *CO_2 Process***

for **ALL-POSITION WELDING OF STEEL IN ALL THICKNESSES**

low costs • easy fit up • high speed • very low spatter • no warpage

In welding mild sheet steel manually, there's only *one way to reduce costs and produce high quality welds* at the same time. Airco Dip Transfer CO_2 Process Welding. Let's be specific: –

- The complete Airco Dip Transfer CO_2 package welds in all positions . . . manually!
- Welds are hydrogen-free.
- Virtually ends warpage – only low average currents are used for burn off.
- Creates little or no spatter.
- Handles typical steel joint fit ups.
- No flux needed.
- Penetrates deeply – critical for high quality.
- Welds much faster than flux-based processes.
- Uses money-saving Pureco CO_2 as shielding gas.
- The basic equipment welds all weldable metals.

The Airco Dip Transfer CO_2 Process gives you consistently *high quality* welds at *lower costs* than any other process. For complete information, phone or write your nearest Air Reduction Representative. Ask for the new 24-page **"AIRCOMATIC CO_2 WELDING" Catalog.**

Pureco CO_2 is supplied by the Pure Carbonic Company, a division of Air Reduction Company, Incorporated.
†Trademark
**Patent Applied For

AIRCO®

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Cuban Air Products Corporation
In Canada–
Air Reduction Canada Limited
All divisions or subsidiaries of Air Reduction Company, Inc.

MOLYKOTE®

LUBRICANT

metalworking news

PUNCH LIFE INCREASED FROM 2,000 to 25,000 HOLES IN STEEL PLATE

These punches (11/16") were used to punch 25000 holes in ½", 1020 cold rolled steel plate. Without MOLYKOTE Lubricants a maximum life of only 2000 holes could be obtained.

A West Coast manufacturer was experiencing low punch life with the best conventional lubricants. Their multiple punching operation consisted of cold shearing 50 holes simultaneously in a single steel plate. A maximum life of 2,000 holes per punch was obtained with ordinary lubricants.

Then, MOLYKOTE Type G was applied to the punch occasionally. The result: punch life was increased from 2,000 to 25,000 holes which afforded substantial savings.

When writing, refer to Item 508

"A LITTLE BOTTLE FOR A BIG JOB"

- **For Extending Die Life.**
- **For Preventing Metal Pickup.**

Try it . . . Order a 10 ounce container of MOLYKOTE Type Z TODAY!

When writing, refer to Item 507

MOLYKOTE CANNOT BE SQUEEZED OUT REGARDLESS OF PRESSURES; EXCELS AS COLD-FORMING LUBRICANT IN METALWORKING

Distortion, Stick-Slip and Fretting Eliminated • Mounting Loads Reduced • Chatter and Noise Avoided • Allows Easier Disassembly

In metal forming the most difficult problem to overcome is scuffing from metal pickup on the dies. Direct contact of bare surfaces of a piece undergoing formation with the die often results in galling, scuffing, etc. If the surfaces can be separated by a lubricant of sufficient film strength, metal pickup does not occur.

Before new dies are used, burnish them with MOLYKOTE Type Z. If the lubricant you are now using does not have sufficient film strength and galling does occur, use MOLYKOTE on your dies.

The automobile industry which forms and fabricates vast tonnages of various metals, uses MOLYKOTE Type Z extensively.

When writing, refer to Item 505

Applying MOLYKOTE Lubricant to feed stock at the Bassick Company, Bridgeport, Conn., in a forming operation.

DAMAGE DUE TO IMPROPER MACHINERY "WEAR-IN" CAN BE ELIMINATED WITH NEW COMPOUND

Wear-in damage is often serious enough to require costly reconditioning of new equipment and if the damage is not repaired, it will interfere with and reduce the useful service life of expensive machinery. During this critical wear-in period, damage due to galling, scoring, tearing, scratching, excessive abrasion and seizing is an inherent hazard. MOLYKOTE WEAR-IN COMPOUND is the most effective lubricant yet developed to combat this damage.

In seven different ways, MOLYKOTE WEAR-IN COMPOUND saves you time and money:

1. **Shortens "wear-in" period without use of abrasives.**
2. **Reduces galling, seizing and excessive wear during the critical "wear-in" period in new or rebuilt machinery and after the installation of replacement parts.**
3. **Offers the best safeguard against costly reconditioning work and shipping delays due to the "breaking-in" of new machinery.**
4. **Eliminates "stick-slip" behavior and resists galling and seizing at bearing pressures far beyond the yield point of any metal.**
5. **Specifically designed for "wear-in" use. MoS_2 particles make intimate contact with bearing surfaces. Will not scrape off.**
6. **Need not be burnished into surface. Brush or wipe on a thin coating.**
7. **Inexpensive . . . a little goes a long way.**

When writing, refer to Item 506

Address your letter to The Alpha-Molykote Corp., 65 Harvard Ave., Stamford, Conn.
Phone: FIreside 8-3724.

SEE OUR CATALOG IN SWEET'S — OR WRITE FOR COPY

THE ALPHA-MOLYKOTE CORP.
Stamford, Connecticut
Please send me details on

Item 505 ☐	Item 507 ☐
Item 506 ☐	Item 508 ☐

Name .....
Company .....
Address .....
City .....
State .....

THE ALPHA-MOLYKOTE CORPORATION

BREAKING LUBRICATION BARRIERS

. . . THROUGH RESEARCH

it will still be as beautiful when she grows up

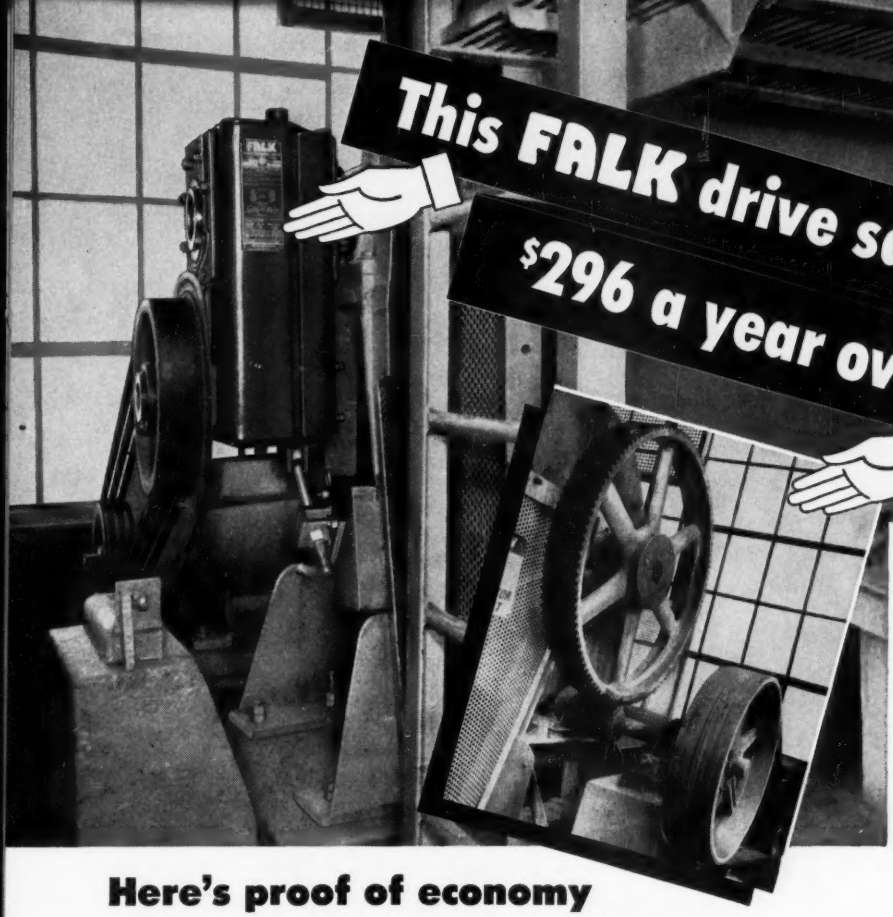
UNILOY
STAINLESS STEELS

Yes . . . when she's ready to drive her own car, she too will want the long lasting beauty and protective qualities of solid stainless steel trim . . . and if this car is still around, the trim will be just as beautiful as it is today.

For stainless that offers maximum ease of fabrication and lasting, lustrous finish, specify Uniloy Stainless Steel.

UNIVERSAL CYCLOPS
UC STEEL
STEEL CORPORATION
BRIDGEVILLE, PA.

STAINLESS STEELS • TOOL STEELS • HIGH TEMPERATURE METALS



Here's proof of economy with FALK Shaft Mounted Drives

PROBLEM—For many years, a prominent Eastern abrasives manufacturer* experienced high maintenance and down-time costs, as well as excessive noise and vibration, in the operation of 19 pebble mills driven by open spur gears. Drive gears and jack shaft pillow blocks required frequent repairs or replacement, and trunnion shafts often failed, due to radial overloading of the bull gear when broken pinion teeth bottomed between gear teeth.

SOLUTION—After numerous unsuccessful approaches to these problems, the solution was found by mounting a Size 315J FALK Shaft Mounted Drive directly on the mill drive trunnion. This eliminated objectionable gear noise and vibration...greatly reduced costly down-time and loss of production...and cut annual maintenance and replacement expenses as indicated by the following figures taken from the customer's records:

Spur Gear-and-Pinion Drive		FALK Shaft Mounted Drive	
Bull Gears	$ 56	VEE Belts	$ 30
Pinions	120	FALK Shaft Mounted Drive (based on 10-year life)	70
Pillow Blocks	90		
VEE Belts	30		
Trunnion (5-year life)	100		
Annual cost	$396	Annual cost	$100
		ANNUAL SAVINGS	$296

IF OBSOLETE DRIVES ARE COSTING YOU MONEY, a change to Falk All-Steel Shaft Mounted Drives can effect important savings in money and production. Used on almost any type of machine, these compact, rugged units are establishing new standards of economy and efficiency in many industries. Specify FALK Drives on your purchased equipment...For full details, **write for Bulletin 7100.**

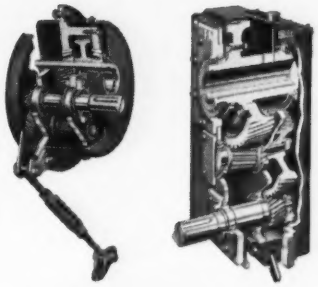
*Name on request

THE FALK CORPORATION, MILWAUKEE 1, WISCONSIN

MANUFACTURERS OF QUALITY GEAR DRIVES AND FLEXIBLE SHAFT COUPLINGS

Representatives and Distributors in Most Principal Cities

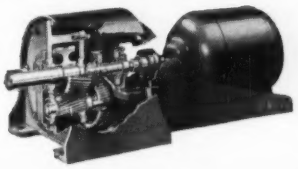
To get the right drive for your application, specify FALK®



SHAFT MOUNTED DRIVES

Horizontal or vertical units—½ to 50 hp—420 to 5 rpm—single and two double reduction ratios—output torque ratings up to 41,000 lb-in (consult factory for higher torque capacity).

• • •



ALL-MOTOR® MOTOREDUCERS

Sizes up to 75 hp—furnished with or without standard foot-mounted motor—standard output speeds 1.2 to 520 rpm (with 1750 rpm motors) —ratios as high as 54,000:1 in semi-standard designs. Integral units (gearmotor type) also available. Ask for **Bulletin 3100.**

• • •

FALK Drives are available from factory and distributor stocks from coast to coast. Consult your Falk Representative or Distributor.

FALK

...a good name in industry

You get steel + plus from U. S. Steel

"I sold them a steel that cost more, so they could pay less,"

SAYS TOM HALLORAN, USS SALES REPRESENTATIVE, PITTSBURGH

"One of my customers, Elliott Company, made some of their turbine discs from a special alloy steel that had to be forged, cross-rolled, heat-treated and torch-cut to size *before* machining.

"I visited the plant with a USS metallurgist who joined a team of Elliott engineers to study their operation, They found they could use USS "T-1" Steel, which is furnished to meet 100,000 PSI minimum yield strength in plate thicknesses up to 2½" inclusive. This eliminated *all* the pre-machining operations.

USS and "T-1" are registered trademarks

"Elliott adopted "T-1" and, even though it cost a little more than the previous steel, it cut material costs 60%, because it saved work.

"Technical assistance in the selection and most economical uses of steel is only *one* of the U.S. Steel plus services."

When you buy from U. S. Steel you get steel plus technical assistance . . . research . . . facilities . . . marketing assistance

United States Steel Corporation—Pittsburgh
American Steel & Wire—Cleveland
National Tube—Pittsburgh
Columbia-Geneva Steel—San Francisco
Tennessee Coal & Iron—Fairfield, Alabama
United States Steel Supply—Steel Service Centers
United States Steel Export Company

United States Steel

Quality... the best economy of all

Another product of Sunoco research . . . a fire-resistant hydraulic fluid

The flame test, above, dramatizes the effectiveness of Sun's new fire-resistant hydraulic fluid. The wick in the conventional fluid burns readily; the wick in Sun's new fluid just can't be lighted.

SUNSAFE, a water-in-oil emulsion, eliminates fire hazards . . . provides increased safety to personnel and equipment. At the same time, operators get the essential performance characteristics of a top-grade hydraulic oil—low rates of wear, long service life, and protection against rust and corrosion.

This combination of *quality* in engineering know-how, and *quality* in product, proves once again that *quality* in any sense is the best economy of all.

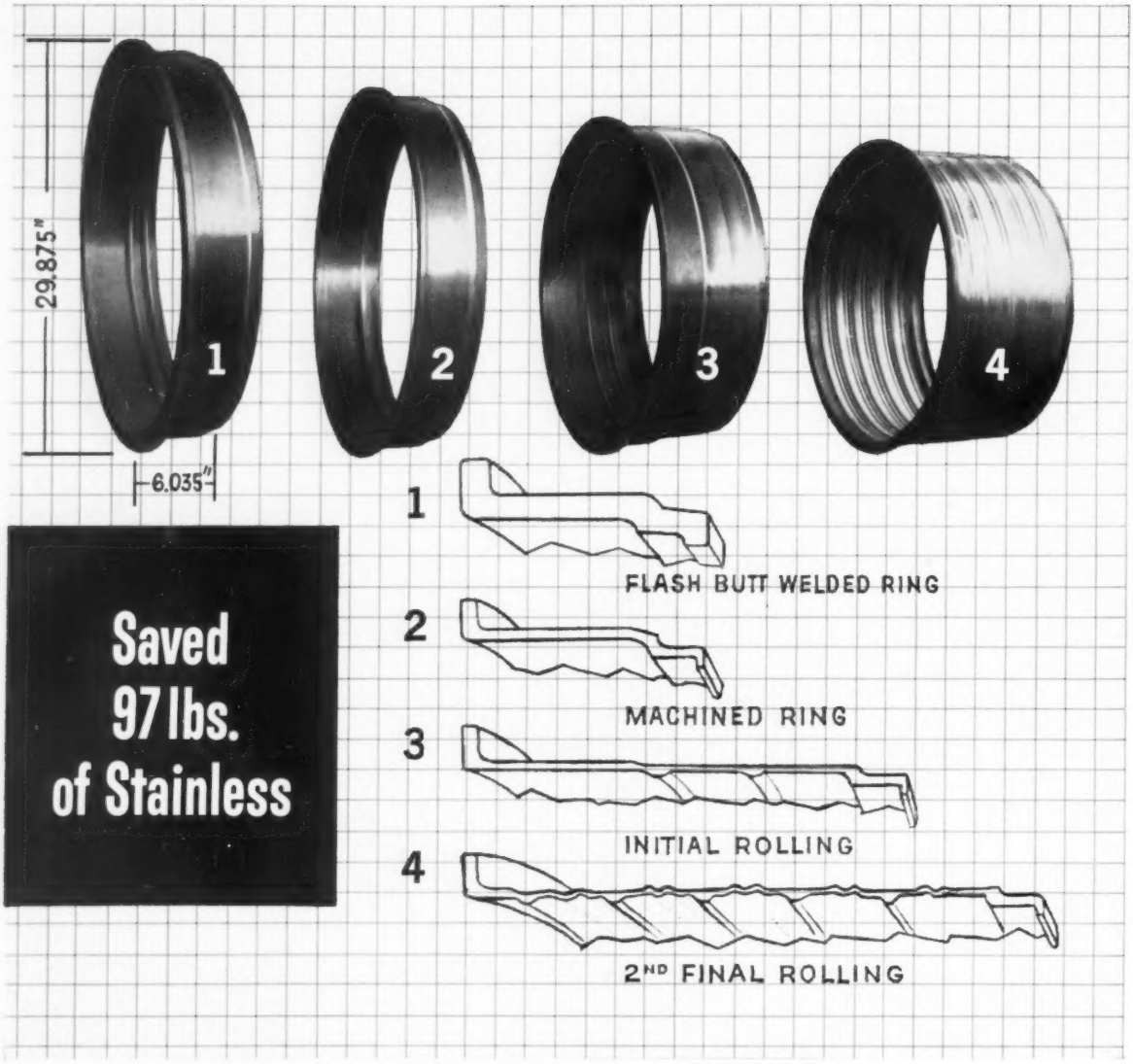
For 73 years Sunoco has meant quality right down the line. Today, this quality is found in more than 400 Sunoco industrial products. SUN OIL COMPANY, Phila. 3, Pa., Dept. I-14.

In Canada: Sun Oil Company Limited, Toronto and Montreal.

MAKERS OF FAMOUS CUSTOM-BLENDED BLUE SUNOCO GASOLINES

SUNOCO

PRINTED IN U.S.A.



Jet Compressor Case is Rotary Roll-Formed From Flash Butt-Welded Rings--Excess Material Eliminated

Have you looked into the cost saving possibilities of using flash butt-welded rings for rolling or spinning operations? Where Amweld rings have been substituted for heavy forged blanks, users report excellent rolling performance and finished parts met all specifications. Cost per part was reduced $25.40 each.

Amweld flash butt-welded rings can help you cut fabricating costs. Write or call today. Better yet, mail us your prints and specifications. We will study your problem and work with you.

GET THE FACTS ABOUT AMERICAN WELDING

Complete information. Facilities brochure, Precision Assemblies Catalog, and booklet on "How Flash Butt-Welded Rings are Made."

THE AMERICAN WELDING & MFG. CO. • 110 DIETZ ROAD • WARREN, OHIO

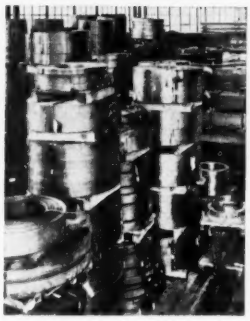
AMERICAN WELDING

STEEL

Metalworking Outlook

September 21, 1959

After the Strike: When Will You Get Steel?



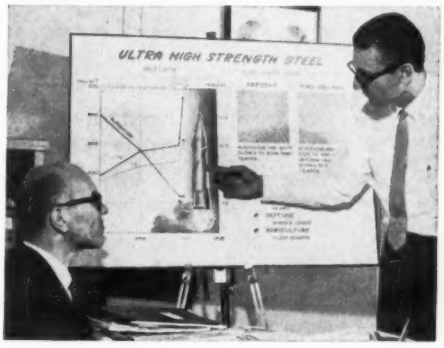
If you placed an order in July for October delivery, you'll probably get it filled in December. If you place an order today, you'll be lucky to get delivery before mid-January. Reason: It'll take at least three weeks after a settlement for mills to get back to 80 per cent of capacity operations—except those with electric steelmaking facilities (who can whip up to that figure in less than a week). It'll take four to eight weeks for the industry to push back to the 95 per cent mark (Page 47).

Local Practice Clauses—The Hitch in Steel Talks

Top negotiators in the steel talks are spending most of their time reviewing the work of industry and union subcommittees. The subgroups are taking up the problem of local work practice clauses, termed by R. Conrad Cooper as the "most important" current issue. Neither side shows signs of changing its position on this question which involves management's right to install operating improvements. The industry wants to be able to initiate improved procedures without first obtaining union approval. Says Mr. Cooper: "The idea of saying that once something is done one way it has to be done that way forever is ridiculous . . . but that is about what we are up against . . . in local practices."

Ford Makes Steel with 500,000 psi Tensile

Dr. Victor F. Zackay (right) and Edward D. Marande are keymen in Ford's push for steels with greater tensile strengths. They've found a way to push an alloy steel into the 500,000 psi range and still retain good ductility. "Our idea is to heat treat and form all at once," explains Mr. Marande (Page 84).



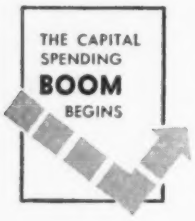
Does Khrushchev Visit Signal Relaxing of Trade Blocks?

As the Russian premier tours the U. S., insiders are beginning to bet stacks of rubles that his visit will lead to an era of rising trade between the U. S. and USSR. Russia probably will never become a major trading area for the U. S., but the shift from a nearly nonexistent to a minor trading partner would have significant implications for metalworking. Russia's shopping list

Technical Outlook—Page 83 Market Outlook—Page 121

includes chemical plants, machinery, steel, plastics, and oil field equipment. And the U. S. might consider buying these items from Russia: Chromium, surgical equipment, scientific teaching equipment. Last year, we sold Russia only $3.4 million worth of goods (vs. total exports of $16.3 billion) and we bought only $17.5 million worth of Russian products (vs. total imports of $12.8 billion).

A New Plant Spending Boom Is Here



Industry is riding the uptrend of a new wave of spending for industrial construction. Contracts awarded this year will be worth 65 to 70 per cent more than those awarded last year. Next year will be even better, when new contracts may be worth $3.8 billion (Page 55). Total spending for plant and equipment by U. S. business this year will surpass last year's mark by 9 per cent (Page 56).

Personal Advice on New Labor Law Available

The Labor Department has established a Bureau of Labor-Management Reports and is developing the forms and procedures for unions and management to use in implementing the new labor law. Representatives of the department in 19 cities are prepared to answer your questions. The cities: Boston, New York, Buffalo, Philadelphia, Cleveland, Detroit, Chicago, Minneapolis, St. Louis, Denver, San Francisco, Los Angeles, Nashville, Tenn., Birmingham, Atlanta, Kansas City, Mo., Raleigh, N. C., Memphis, Tenn., and Dallas.

Here's a Distant Market Worth Checking

Ever consider the market possibilities for your firm in commercial rocketry? Other farsighted metalworkers are. Example: Could you supply components for rockets that would carry mail or other hot cargo from Los Angeles to London (picture)? Some of the money for the development of commercial rocketry may come from government agencies: Post Office, Defense, Interior (Page 52).

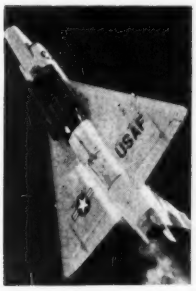
Next Big Test of Engineers' Union Tendencies

The next big test of engineering employee sentiment toward unions will probably be at Western Electric Co. No election date has been set, pending an NLRB disposition of the voting rights of 500 employees, but the company has sent each of its engineers an 18 page booklet explaining why it opposes the engineering union. The firm charges that the union has sought to make a mockery of the engineer's role in company management, has campaigned to destroy engineers' loyalty to the company, and has sought to create mistrust between engineers and supervisors.

UAW to Seek Dues Hike

Look for the UAW to seek a dues increase of at least $1 a month when it convenes in Atlantic City next month. The money would probably be split between the general and strike funds. Both are weak. Emil Mazey, UAW secretary-treasurer, says the union paid out more than $30 million in strike benefits to around 70,000 members during 1958-59.

Why Aircraftmakers Are Diversifying



"We were marched over a cliff in December," declares G. O. Detweiler, president, Chance Vought Aircraft Inc., Dallas. "We intend to reduce the size of any future cliffs." Many makers of aircraft and missiles feel the same way about defense business, so they're diversifying rapidly to protect future profits. It's taking some into completely new fields (examples: voting machines, hi-fi, foundry equipment), most are sticking to products that fit into the weapons system pattern (Page 50).

Romney Sees Big '60 for Autos

George Romney, American Motors president, believes 1960 auto sales will total 6.2 million to 6.8 million units, of which 2.25 million will be smaller cars. (for other predictions see Page 54.) He indicated that Rambler's share would be about 500,000 cars (vs. '59 model sales of around 370,000). He said American Motors' steel supplies are in better shape than those of any other automaker except Ford. He also teed off on the steel companies and the USW last week, saying: "Collusion between these two excessive forces is confronting us with . . . ultimate intervention by government . . ."

Investment Casters Will Widen Their Markets

Firearms, hand tools, sewing machines, surgical devices, business machines, farm machinery, electronic and electrical equipment, canning and shoe machinery, garbage disposers—all have investment cast components. Makers are looking for new applications daily. The weight range of investment castings has widened considerably—from a fraction of an ounce to more than 100 lb. Blades and vanes for the aircraft industry are still the biggest sales items, but their portion is declining (Page 123).

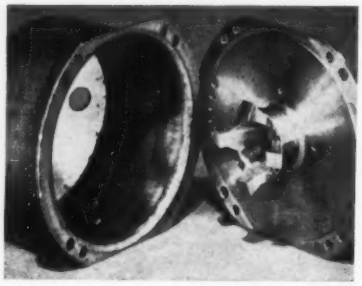
GSA Sets Nicaro Sale Date

Bids for Nicaro, the government owned nickel plant in Cuba, must be in by Dec. 1. A prospectus, specifying the basis for submitting proposals, is available from the Commissioner, Defense Materials Service, General Services Administration, Washington 25, D. C. The bidding is "wide open to any responsible party," but the bidder must be U. S. controlled. (That rules out Inter-

national Nickel Co.) National Lead Co., whose Nicaro Processing Corp. affiliate has been operating the project, is expected to bid. Probably more than $100 million is invested in the property, including the plant, transportation system, labs, warehouses, port facilities, and inventories of fuel and equipment. The ore reserves will be included in the sale.

How Material Switch Saves Navy Money

This housing and inner pole for a Navy fire control gyro was made from a 50 per cent nickel iron. A switch to magnetic ingot iron saved 88 per cent on the housing, 36 per cent on the inner pole. Machining costs were cut from $12.25 to $9.10 per unit on the inner pole (Page 98). Are you using the best material for every job?



Housing Starts Stay High

The seasonally adjusted annual rate of new home starts for the first eight months of this year is 1,379,000 (vs. 1,042,000 last year), reports Commerce Department. August private home starts climbed to 124,800—300 more than in July. Public and private home starts combined in July totaled 129,000—highest for any August since 1950.

Machine Tools & Foreign Trade

National Machine Tool Builders' Association has written a 26 page letter of complaint to the Office of Civil & Defense Mobilization concerning the drop in machine tool exports and the rise in imports. The letter is not a petition for relief under Section 8 of the Trade Agreement Act, but it might be considered the beginning of a campaign to secure some sort of mitigation. NMTBA may never really petition for relief, however, since there's no unanimity among the builders.

Straws in the Wind

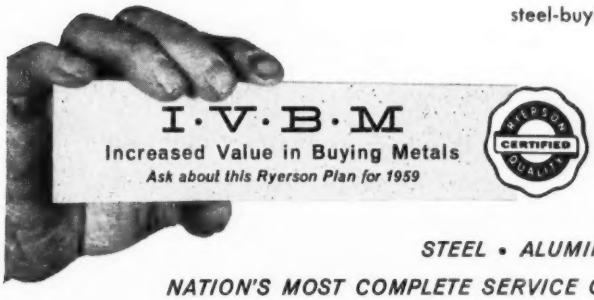
Federal-Mogul-Bower Bearings Inc. is enlarging tenfold its capacity to produce high temperature metal powders at its Ann Arbor, Mich., facilities . . . U. S. Steel Corp. is launching its sixth Operation Snowflake to help boost Christmas sales of major appliances . . . Frigidaire Div., General Motors Corp., will enter the gas dryer business with four new automatic models; it thinks that 55 per cent more gas dryers will be sold in 1965 than today . . . Continental Can Co. will continue offering quart aluminum oil cans at the same price as steel cans at least through 1960; the program was scheduled to end last month . . . The roof cave-in at Chevrolet's foundry on Sept. 14 sent 3000 employees home, but they were back to work three days later . . . The USW started negotiations last week with American Can and Continental Can, where labor pacts covering 50,000 employees expire Sept. 30.

but only one was right for the job

Severe stresses imposed by this forming operation caused a high rate of reject for a fabricator using hot rolled plate to the usual ASTM—A7 specification. A call to his Ryerson Steel Specialist brought a suggested change to Ryerson welding and forming plate—a prompt solution to a costly problem.

Even in "plain carbon steel" applications, there's usually only one steel that's *exactly right* for each job. Nationwide, daily experience with a wide range of material selection and fabricating problems puts your Ryerson Specialist in the best position to know what is exactly right for *your* job. Backed by complete and diversified stocks, Ryerson can best supply that exact specification fast!

Let us help you make sure you get optimum value for your steel-buying dollars on every order—call Ryerson today.



RYERSON STEEL®

Joseph T. Ryerson & Son Inc., Member of the INLAND Steel Family

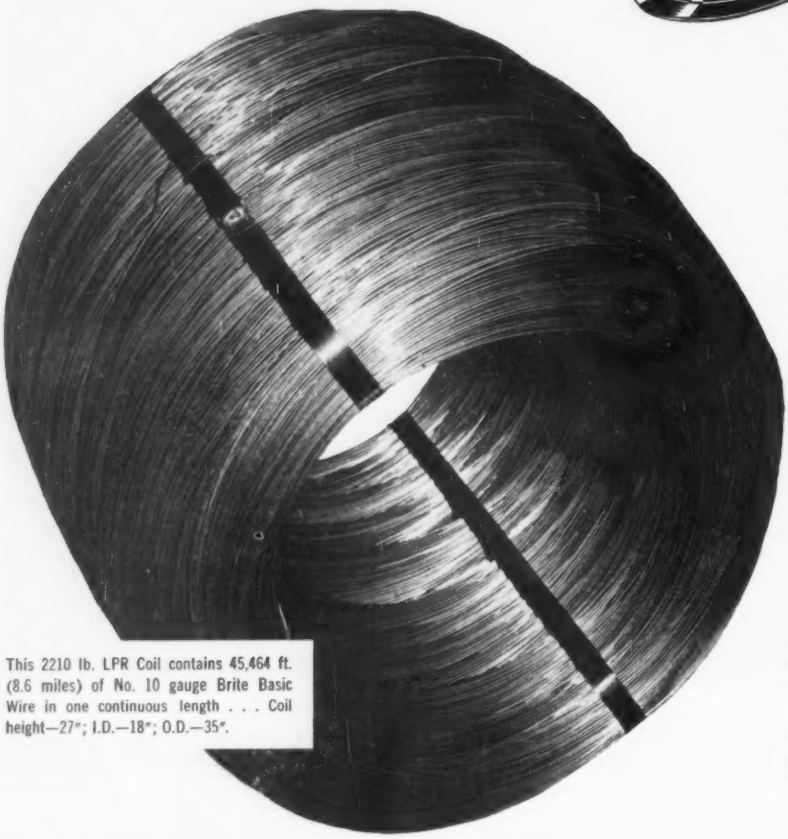
STEEL • ALUMINUM • PLASTICS • METALWORKING MACHINERY

NATION'S MOST COMPLETE SERVICE CENTERS IN PRINCIPAL CITIES COAST TO COAST

Progressive Brite Wire Fabricators

report their savings and related benefits after switching from traditional short-run bundles to

DSC–Portsmouth Long Production Run LPR COILS



This 2210 lb. LPR Coil contains 45,464 ft. (8.6 miles) of No. 10 gauge Brite Basic Wire in one continuous length . . . Coil height—27″; I.D.—18″; O.D.—35″.

WE QUOTE*

• • • Downtime frequency due to coil changes and setup adjustments decreased 50% to as much as 92.8%.

• • • Cumulative coil remnant scrap trimmed to the bone.

• • • Overall man-hour costs cut 15% to 20%.

• • • Small coil racks obsoleted.

• • • Self-supporting, also possessing greater density (weight per cubic foot), LPR'S reduced storage area requirements, cut unloading time from 15% to 50%, increased all-around efficiency of material handling.

• • • Rid us of the bother and cost of caring for vendors' returnable carriers.

• • • Improved efficiency of our inventory management.

*** Does Macy's tell Gimbel's?**
When manufacturing costs are involved, it is contrary to our customer-relations principles to tell "Gimbel's what "Macy's" is doing, without specific approval. We will, however, arrange to document any of these statements for bona fide Brite Wire users.

FOR THE RECORD—We introduced 1,200 pound Long Production Run Brite Wire coils in 1953. By 1958 we had demonstrated their practicability in weights up to about 4,000 pounds. Since 1957 we have been giving 3,000 pound LPR's the proving-ground treatment in our own Welded Wire Fabric operations . . . with substantial savings in overall handling and production costs . . . *We'll be glad to share our experiences with Brite Wire fabricators. We'll also help you stage conclusive trials on LPR's under your own wireworking conditions. You'll be the judge of their cost-reducing potentials. For more complete information call a DSC Customer "Rep" or write to Box 4308, Room 308, Detroit, Michigan.*

Detroit Steel Corporation

General Sales Office, Box 4308, Detroit 9, Michigan

DSC PRODUCTS: Coke . . . . Coal Chemicals . . . . Pig Iron
Basic Open Hearth Steel Ingots, Blooms, Slabs, Billets, Rods
HR and CR Sheet and Strip . . . . . Flat CR Spring Steel
Mfrs.' and H.C. Specialty Wire . . . . . Welded Wire Fabric

The PROOF of DSC STEEL is in its PERFORMANCE on YOUR job

Customer "REP" Offices in Principal Cities

Customer Satisfaction–Our No. 1 Job

COPYRIGHT DETROIT STEEL CORPORATION 1959

Wasted Engineering!

As a problem in industry, "Who Pays for Engineering?" (STEEL, Aug. 30) goes deeper than you think.

We pointed out that if you built a new house, you would hire an architect to draw up plans, submit them to several contractors, then award the contract to the one you thought would do the best job at the lowest price.

You would pay for the "engineering."

Not so in the metalworking industry. If you needed a new processing line or a piece of equipment built to your requirements, you would ask perhaps six suppliers to submit proposals. One would get a contract.

You would expect the supplier to:

1. Analyze the problem and come up with a tentative solution.

2. Spend "X" number of engineering hours drawing up detailed specifications.

3. Build the equipment.

4. Guarantee that the equipment would perform as promised, which could mean substantial "debugging" costs.

The five potential suppliers that lost out would be obliged to follow Steps No. 1 and 2.

The result: Hundreds of wasted hours of problem solving and engineering time. Since few jobs are alike, seldom can the wasted work be diverted to a useful purpose. What does this mean to you, the buyer?

In placing a contract with the successful bidder, you may think you are paying for engineering only once.

But, remember, the successful bidder isn't always successful. He must charge you for part of the engineering on the jobs he lost.

So, in reality, you are paying for wasted engineering.

Irwin H. Such
EDITOR-IN-CHIEF

on the Mighty Mississippi . . . a single Cleveland reducer drives this dredge's 48-inch auger

Keeping America's major rivers navigable is a tremendous year 'round job. It takes rugged dredges that can stay on the job 24 hours a day, if necessary.

This 12-inch hydraulic dredge operated by the Ferd J. Robers Company of Burlington, Wisconsin moves approximately a million yards of sand, gravel and muck from the Mississippi River bed annually. Its 48-inch diameter knife is driven by a large Cleveland Worm and Gear speed reducer that's providing trouble-free service year in — year out.

Many Clevelands are still in use today after more than 35 years of rugged service in mills, mines and on all types of industrial equipment. Whenever a powerful, trouble-free, right angle drive is required, consult your local Cleveland representative — or write us direct for Bulletin 145. It gives the complete Cleveland Story.

The Cleveland Worm & Gear Company
3270 East 80th St., Cleveland 4, Ohio

A subsidiary of
Eaton Manufacturing Company

Affiliate: The Farval Corporation

CLEVELAND
Worm Gear
Speed Reducers

After the Steel Strike: What to Expect

- **For the first 30 days, generally more severe shortages than during the walkout.**
- **In ten days, the start of shipments on orders placed just before or early in the strike. The industry will reach 80 per cent of capacity within 30 days.**
- **Within 60 days, high volume of shipments as mills hit 90 plus per cent of capacity.**
- **Within 90 days, the filling of most orders that were placed just before or during the strike.**
- **Within 90 to 120 days, the start of deliveries on orders placed at the time of settlement.**

IF YOU PLACED an order for steel before the strike or in the early days of the walkout and asked for October delivery, chances are you won't get shipment before December.

Mills won't reach 80 per cent of capacity until nearly a month after the settlement. It'll take at least six weeks, in most cases, to push facilities up to a 95 per cent operating rate.

• **Order Now**—If you place an order for steel today, here's what is likely:

First, your order may not be accepted. Many mills are booked solid through December and won't accept orders now for 1960 delivery.

You may pressure a district sales manager into accepting your order, but chances are he won't forward it to the mill. Instead, he'll file it under today's date, planning to work it into mill schedules after the strike is settled.

In any case, your chances of getting delivery this year on an order placed today are mighty slim. On some products, you may even have to wait until February, 1960. There are a few exceptions. Tool steels, for example, will be fairly available within six to eight weeks after the mills resume operations. Reason: Several tool steel producers have continued operating during the strike. Also, some of the companies on strike have substantial quantities of in-process material that can be released for immediate shipment after the settlement. If there is a shortage of tool steel, it will be in the carbon and oil hardening types, not in the alloys. But if annealing furnaces hold up, no serious shortages will develop.

• **Sheets: The Big Pinch**—If your order is for sheets or strip, you won't be nearly that fortunate. It will be at least three weeks after a settlement, and possibly six, before sheet mills get back to 80 per cent of capacity. It'll be four to eight weeks before they hit 95 per cent. The degree of the lag depends on how much repairwork is required. One major producer says it won't get above 90 per cent for the rest of this year due to extensive maintenance work. Although repairs will be deferred where possible, steelmakers won't know the full extent of their damages until they get rolling again. Some major open hearth repair jobs are likely.

It will take 10 to 14 days longer to get cold rolled products moving out the door than it will for hot finished items. In some cases, it'll take a few extra days to begin shipping galvanized products—and orders for them are huge.

There's a difference, too, if your supplier has electric steelmaking facilities. If so, he can hit 80 per cent of capacity in seven to ten days, 95 per cent in 10 to 20 days, barring major difficulties with refractories. That's less than half the time it takes with open hearth facilities. One electric steelmaker expects to reach 100 per cent of capacity in six days.

• **Order Books Crammed** — But even after steelmakers have their production in high gear, they've got a lot of steel to roll before they can consider processing an order you release today. Getting their July and August promises filled will carry them into November. An order originally intended for September delivery may be filled in November, but more likely in December.

Sheet mills are booked solid for 90 to 110 days. So if the strike were settled tomorrow, you'd be lucky to get delivery before Jan. 15, 1960, on an order placed today. And that order you placed for October delivery could be shipped in December only if facility breakdowns are held to a minimum. It means that steel users face more serious shortages after the walkout is over than while it's in progress.

Critical areas will include plates, galvanized sheets, and tin plate.

• **Problem in Plates**—Some producers figure they can reach 95 per cent of capacity operations on plate

mills in two to three weeks after a settlement. But that rapid start won't make up for the order jam they face. Backlogs of three to four months are common. Sheared plates, particularly from 100 in. and 160 in. mills, will be in tightest supply; heavy gages will be scarce.

• **Oil Country Goods** — Producers won't know what they can promise until they tote up the carryover from July and determine how much they must set aside for downriver terminals (warehouses set up near the fields to provide quick deliveries to small companies). Orders booked for September and October delivery won't be shipped before December. Sales executives are warning users to order now if they want anything before yearend—and then, they're not making too many promises. As with other products, orders will be processed by date of order acceptance. Hardest to get will be 4½ to 5½ in. casing, 2⅜ and 2⅞ in. tubing, and "spaghetti," the small stuff (1¼ in., 1½ in., and 2 1/16 in. OD) used in dual completion drilling programs.

• **You'll Sweat for Structurals**—Mills can whip up to 95 per cent operations on structural facilities in two weeks or so, but they're booked solid for 10 to 12 weeks on most products, longer on wide flange beams.

• **Hot Bars Are "Hot"**—It'll take about a month to hit 95 per cent operations on hot rolled bars. Mills are booked solid for two months and, on some varieties, for more than three months. In the Chicago area, the larger sizes (over 3 in.) will be particularly hard to get.

• **Cold Bars** — Barring equipment breakdowns, cold mills will be in high gear in a week to ten days. But producers can't tell how soon they'll reach near-capacity operations in cold finished bars because they don't know when the hot mills will begin to ship the hot bars to rework. And they don't know what the product mix will be when pipelines from the hot mills do get filled. Expect all sizes of cold finished bars in the popular grades to be in tight supply till yearend.

• **Pipe**—The delivery problem will be less severe in pipe than with most other items. One producer assured STEEL that it could ship any requirement for buttweld pipe within 30 days of startup. You will probably be able to get deliveries of seamless pipe, if you place an order today, within 60 days of the strike settlement. Orders placed earlier will be shipped before then. Exception: 2 in. to 4 in. sizes, which will be in short supply for the rest of the year. A few items will be available in two weeks after the settlement.

• **An Automaker's Solution** — Chrysler Corp. has signed with Lone Star Steel Co. (Its employees are working without a contract) to accept any slab steel the firm can produce in excess of its needs for pipemaking. Chrysler will farm out the metal to other rolling mills for finishing. Point: It will avoid the lag in getting deliveries after the strike, while open hearths are being repaired. The contract runs for 60 days and a possible 30,000 tons of steel are involved.

Strike Losses

(Through Sept. 21)

Lost Steelworker Wages

---------- $707,600,000

Lost Sales

---------- $2,058,000,000

Lost Production (ingot tons)

---------- 19,533,900

Other Losses

Overhead, depreciation, and salaries of nonproduction workers in steel.

---------- $392,000,000

Tax Losses to U. S.

---------- $450,000,000

Little Conversion Steel Available as Stocks Fall

Demand for conversion continues, but little steel is likely to be available for such purposes until the strike ends.

At present there is no capacity for ingots or semifinished steel or open rolling space. (Exception: Lone Star-Chrysler deal—see above.)

Even after the strike is over, the volume of conversion is not likely to be big compared with what it was during the Korean War. Most steelmakers now have better balance between their raw steel capacity and rolling capacity than they did a few years ago.

Whatever business is engaged in, sheets and plates are expected to predominate.

Some observers are looking for good business in the first half of 1960, and they figure there will be no shortages of steel after mills catch up with orders now on the books. Reason they think business will be good in the first six months: Consumer inventories are getting pretty well run down.

That's the average pay boost labor is getting this year, but . . .

Management Gains Too

NEGOTIATED wage increases average 6.68 cents an hour thus far in 1959.

That's the weighted rise calculated by Associated Industries of Cleveland for 181 settlements covering 71,400 hourly employees in northeastern Ohio. Labor's gains in the area are typical of national patterns because of the region's industrial diversity—both in size and type of companies.

• **The Fringe Situation**—The figure of 6.68 cents excludes cost of living adjustments and fringe benefits. Where fringes are negotiated, the added cost ranges from 2 to 5 cents an hour.

Few new benefits are being granted. Nearly all of the increased expense comes from liberalizing existing fringes, particularly insurance, vacations, and holidays.

Included in the wage figure are increments paid for the first time in 1959 but provided for in prior contracts.

• **Concessions by Labor**—Not showing in the wage figure are concessions widely won by management. "To get competitive or keep competitive," says AIC, "many companies were compelled to redefine the rights of management." In three major areas, labor has agreed to:

1. Eliminate unproductive time practices.
2. Allow fuller use of equipment.
3. Allow greater managerial prerogatives in promotion, demotion, job transfer, hiring, firing, standards, and subcontracting.

The Cleveland organization summarizes: Usually the terms of the agreement indicate that companies will be able to achieve new operating efficiency.

• **Tough Bargaining** — "Management is documenting its position at the bargaining table with unusual thoroughness," comments AIC. "Company representatives come with a long list of contract changes or demands of their own."

Many labor representatives, in United Steelworkers of America and other unions, are marking time to see what happens in steel. That's why an unusual number of contracts are being extended this year to await a clue from steel.

Secondary Job Losses Mild

Some 82,200 workers in industries dependent on steel were laid off in 31 major industrial areas during the last half of August because of the steel strike.

The Labor Department says that was an increase of 12,000 from the first half of August. The job situation in the 31 areas is "not expected to change significantly over the next few weeks" because "most areas reported enough steel on hand to maintain production at or near current levels to the end of September." However, it forecasts heavy job losses if the strike lasts into October.

Few strikers have gone on relief, the report indicates. But there was an increase in relief applications in Gary, Ind., Cleveland, Youngstown, and Canton, Ohio.

In general, says the Labor Department, strikers and other workers laid off because of secondary effects of the walkout are having trouble finding other jobs.

About 500,000 steel and 145,000 other workers are idled across the nation by the strike.

To Smooth Out Peaks and Valleys... Aircraft Companies

*Including spares, ground handling, and supporting materials. Source: Aerospace Industries Association.

"OUR PROFIT and sales curves since World War II look like a couple of roller coasters," declares a top executive of one of the nation's largest airplane corporations. "We've got to find ways to even out those peaks and valleys, so we're diversifying as fast as we can without sacrificing our position in the aircraft-missile program."

That thinking is typical in the aircraft industry. As W. P. Gwinn, president of United Aircraft Corp., East Hartford, Conn., puts it: "We are diversifying because of a change in the nature of government requirements for our types of products. Of equal importance is our desire to fully utilize our engineering, technical, and production skills. We are also interested in attaining a sound balance between government and commercial business." A vice president of Republic Aviation Corp., Farmingdale, N. Y., remarks succinctly: "We simply have to protect earnings."

• **Changing Picture**—The switch from manned aircraft to missiles (see graph above) has put the industry's profits in a tailspin. Last year, earnings slumped to the lowest point in five years because of intensified research and development costs, says the Aircraft Div. of the National Credit Office, New York. Employment has declined and production facilities have been idled because a greater percentage of the dollar volume has gone into R&D while production of end products has dropped.

• **All the Eggs**—Currently, Republic Aviation is 100 per cent dependent on military business. The company would like a 50-50 split between military and industrial products. Bell Aircraft Corp., Buffalo, is aiming at the same target. (During the first half, about 70 per cent of its business was defense.) Francis W. Dunn, assistant to the president of Bell, feels that the move is necessary to stabilize sales and profits from year to year by providing a cushion against the ups and downs of the defense program.

But there is no willy nilly rush toward diversification. "We do not intend to diversify for the sake of diversification," says United Aircraft's Mr. Gwinn, "but rather to extend our activities in those fields in which we are equipped because of our proved technical capabilities."

In fact, the industry has been working on diversification for some time. J. G. Byron, executive vice president of Curtiss-Wright Corp., Wood-Ridge, N. J., says his company began its program ten years ago. Now the company makes products for such unrelated fields as textiles and textile machinery, autos, industrial controls, measuring gages for paper, steel, and rubber industries, food processing, road surfacing, oil and chemical plants, and marine and stationary diesel engines. One of its latest developments

Turn to

Electronics

Appliance accessories

Data handling systems

Communications systems

Shipbuilding

Monorails

Atomic energy

Air conditioning systems

Voting machines

Construction

Industrial controls

Optics

Motors

Hi-Fi and TV

Plastics

Measuring devices

Foundry equipment

is the Air-Car, a four passenger vehicle that can travel over land, water, swamps, or mud on a cushion of low pressure, low velocity air.

• **Guiding Concept**—As indicated by the partial list this page, diversification has led the industry in many directions, but most producers have chosen to go into fields supporting their primary business of making aircraft and missiles. The big influence has been the concept of a "weapons system" in modern defense.

Lockheed Aircraft Corp., Burbank, Calif., is typical. It is heavily in both military and civilian aircraft, but many of its other products are closely allied to these: Missiles, satellites, space vehicles, surface transportation systems, air, ground, and underwater electronics, industrial applications of nuclear power, aerial delivery systems, flight training aids, and aircraft loading equipment.

In addition, Lockheed bought a shipbuilding company within the last year. Even this is a logical extension of the "weapons system" concept, since the company is prime contractor for the Navy's submarine launched Polaris missile. Lockheed officials have stated that one reason for probing into other fields is "to increase our ability to manage weapons system teams."

• **Electronically Minded**—The system concept has made electronics the most fertile field for new endeavor in the last five years, and it looks like the pattern will hold for some time. In STEEL's survey of 22 major firms, electronics was the most popular choice for expansion. While the primary emphasis has been military, several have indicated interest in electronic data handling machines and machine tool controls. Lockheed officials reported they "hope to broaden electronic competence into two areas—communications and computers—and to diversify further into industrial electronic and electrical controls as well as automation systems."

• **How They Do It**—In widening their scope of business, aircraftmakers have used all of the conventional methods—acquisition, merger, licensing agreements, product development—but the most popular method has been through basic research and development. It is a logical step because of the huge engineering forces already mobilized for R&D defensework. Chance Vought Aircraft Inc., Dallas, says it spent $5 million last year and will spend another $8.5 million this year.

• **Problems**—But the road has not been a throughway to success. Many officials report that diversification has created administrative and marketing problems which have called for the complete reorganization of companies. For instance, after embarking on a diversification program last December, Chance Vought set up five divisions—astronautics, aeronautics, electronics, range systems, and research. "We were marched over a cliff in December," exclaims G. O. Detweiler, president. "We intend to reduce the size of those cliffs."

Cessna Aircraft Co., Wichita, Kans., which currently has a 40-60 breakdown in favor of commercial products, is aiming for an even higher concentration of civilian business—about 70 per cent. It has divisionalized its activities with separate sales organizations to meet marketing problems for each line of products.

Ryan Aeronautical Co., San Diego, Calif., has had to expand its sales force about 25 per cent to handle its new electronics and commercial aircraft products.

Where the new products are closely related to the basic aircraft or missiles business, some companies, like Bell, have simply integrated them into the sales organizations of the parent company or subsidiaries.

• **More Coming**—Despite the problems involved, the trend is going to continue. While they have no intentions of turning their backs on a $10-billion-a-year defense market, all but one of the respondents to STEEL's survey indicate they plan to diversify more within the next two years. The exception already has 65 per cent of its production in civilian products.

Titanium Helps with Nickel

Nickel extraction equipment has gone into operation at Freeport Nickel Co.'s plant in Moa Bay, Cuba. More than 28,000 lb of Republic Steel Corp.'s titanium went into the installation.

Titanium proved to be the best material to withstand the highly corrosive slurries of cobalt, nickel, and sulfuric acid which are processed at Moa Bay. Freeport Nickel credits the metal with making the Cuban plant possible. Titanium is used for draft tubes, valves, piping, internals, and nozzle linings in giant 106 ton leaching reactors where nickel and cobalt are extracted from lateritic nickel ores by acid leaching.

Freeport plans to produce 50 million lb of nickel a year, using 6300 tons of ore per day. The company has split its processing into two plants: The Moa Bay unit will treat ore and produce a shipping concentrate. A refinery at Port Nickel, La., will produce pure nickel and cobalt from the concentrate.

From Missile Mail . . .

These Steps to Commercial Rocketry

FARSIGHTED metalworking firms are enthusiastic about the commercial possibilities of rockets and missiles. They are willing to put their money into the development of concepts which may not pay off for years, maybe never.

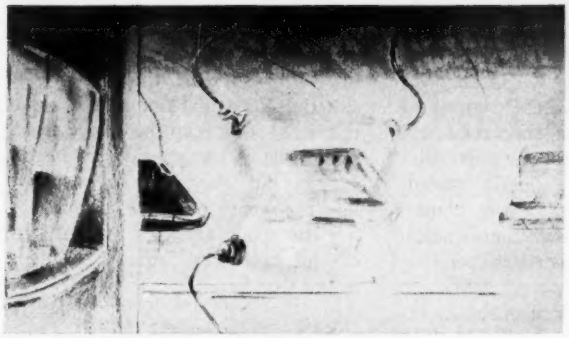
• **The Lobber**—Take the Convair Div., General Dynamics Corp., San Diego, Calif. Its Lobber was designed to supply front line troops with food and ammunition. Convair developed it with the hope that the Army would come through with a contract. The vehicle has been test fired several times, but the Army isn't buying—yet. But "there is some interest by the Army in the prospects of something like Lobber," says a spokesman.

The example points up the main problem facing commercial rocketry: Money is going to have to come from Uncle Sam in one form or another. It may be the Post Office Department or the Defense Department, as was the case with the early developments of commercial airlines, or it could come from other interested government agencies, depending upon the concepts that metalworking firms can develop. It is conceivable, for example, that someone will come up with a rocket to use in fighting forest fires. In that case, the Interior Department would be a logical source for funds.

• **The Firefly**—Solar Aircraft Co., Los Angeles, reports its Firefly rocket is designed for use by airports in the fighting of aircraft fires. Solar says it would cost little more than a fully equipped airport fire truck but would be able to reach a crash scene 5 miles away in less than 1 minute. The Firefly would hover over a crash, spraying about 1 ton of extinguishing fluid. Solid fueled rockets attached under the missile body would propel it. Solar, like Convair, is spending its own money on the project.

Ludwig Roth, Solar's chief engineer of research and development, suggests other commercial uses of rocketry: Weather explorations, some sort of weather control, and ship-to-shore rescue rockets. He guesses that rocket transportation may be farther off than some experts think because the airlines are moving toward supersonic ramjets rather than rockets.

• **Missile Mail**—The country's imagination was stirred June 8 when Postmaster General Arthur E. Summerfield announced: "A guided missile . . . landed successfully on our East Coast with a shipment of U. S. Missile Mail." The Navy and the Post Office Department staged the event with a Regulus I launched



SPRAY ON PACKAGING— The Air Force envisions this system: Items to be shipped by missile freight will flow on air streams past nozzles which spray on plastic to create the perfect package. The plastic will become spongelike to absorb the shocks of missile travel

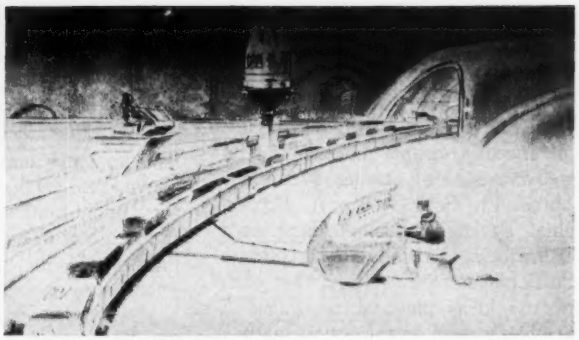


PHOTO LABELING— The plastic will be transparent so identification of the item will be no problem. Labeling will be done automatically with a photographic process (still in the development stage). Labels will be read automatically at transfer points

MISSILE FREIGHT— This is the most expensive concept of commercial rocketry, but men of vision think it is inevitable because the armed services will demand fast delivery. Potential savings in pipeline and warehousing costs may spur development too

SUBOCEANIC TRANSPORT— The Air Force's concept of secret, underwater supply lines to overseas bases would be cheaper to develop than missile freight. The rocket would be "launched" on a track, then ride free to its destination with guidance systems

from a submarine at sea. It leads some to believe that eventually the department will lead the way to commercial rocketry by paying missilelines to deliver mail. There is a need for missile mail to isolated areas and for high priority mail across the continent or overseas. Whether anyone is willing to pay for such service is another question.

Mr. Summerfield concluded that the June 8 flight proved mail could be delivered by missiles, but he has not followed up with a development program. Gen. Edson O. Sessions, deputy postmaster general, told STEEL the department has not attempted to figure out the costs of missile mail, but it is willing to listen to firms with proposals. At least two have talked with the department.

This fiscal year, the department will spend about $15 million on research. (Much of it is in the development of automatic mail handling equipment.) How soon some of that money will go to missile mail is not known. The bird must be developed first, so the department will know what it is getting into. Aerojet-General Corp. (a subsidiary of General Tire), Azusa, Calif., is serious about a program and will probably make a full scale presentation to the department.

Aerojet has a number of proven rocket motors for mail or cargo freight, says Dr. Herman Schneiderman, technical specialist, Aerojet's Astronautic Systems Analysis Dept. "Preliminary calculations on four representative production rocket motors show ranges from 35 to 135 miles, with payloads varying from 50 to 100 lb." A 500 lb load could be carried 1030 miles by a rocket powered by an engine with a total impulse of 2.3 million lb per second. Such a rocket would weigh about 12,000 lb.

Propelling techniques for military missiles may also be turned to drilling wells. Aerojet's weather sounding rockets have been work horses of the International Geophysical Year. Its Aeroform process harnesses

the power of explosives for many forming jobs. Cloud seeding and forest fire fighting rockets have been studied.

• **Missile Freight**—One of the most advanced concepts of commercial rocketry is being studied by the Air Force. Lt. Col. George A. Davies, chief, Packaging Branch, Equipment & Facilities Division, AF Directorate of Transportation, reports that each of the ideas pictured on Page 53 "is being worked on conceptually." Again, money is the key to how soon such programs reach the engineering stage. The services need practically instantaneous transport now. The AF, for example, could eliminate all overseas and stateside warehouses maintained for its tremendous complex of overseas bomber bases. "Ideally," says the colonel, "supplies should be fired by missile direct from the manufacturer to the overseas base."

Two steps to missile freight are under development: Spray on packaging and photo labeling. Atlantic Research Corp., Alexandria, Va., has done work on foamed-in-place polyurethanes for packaging supplies which are to be air dropped. A similar concept could be used for missile freight, suggests Colonel Davies. A large manufacturer is studying photo labeling techniques which will allow packages to be automatically read, then fed into pneumatic tubes, and fired by rocket power. The crux: To take full advantage of the time saving possibilities of missile freight, packaging and handling techniques must be equally speeded up.

If enough money were spent on spray on packaging and photo labeling, the techniques would be with us in a year, says Colonel Davies.

• **Satellites**—STEEL talked with a high official of the National Aeronautics & Space Administration about commercial rocketry. He suggests many commercial uses will come available as our space effort continues, but they will come over a period of years. Civil aircraft are already using JATO bottles (Jet Assist Take-Off), and stunt car drivers use a small version.

Atlantic Research will build about 800 Arcas rockets this year, some of which will be used for weather studies by the Weather Bureau. NASA has been firing Arcas rockets for some time to determine upper air winds. Mapping by satellites is also almost with us. NASA suggests three or four satellites in orbit at 22,000 miles would stay relatively fixed in relation to their position above the earth. Properly placed, they could map the whole planet. If the orbits were lower, more satellites would be needed, depending upon how low they were.

Marketwise, you can probably expect many satellites to be used in these preliminary studies, but there is no source you can go to for an estimate of how many will be used. Security is involved because of the overlapping of NASA vehicles and military rockets. At least, you can be sure that some satellites will wear out, so there is a replacement market. A satellite's life depends upon the life of its electronic system and power supply. Today's satellite is out of action within two weeks or so, although one of the Vanguards and Explorer VI will keep going because of their solar batteries.

The life of the transistor has much to do with the life of the satellite. Perhaps 18 months is about the most that can be expected of a transistor today, says a NASA source, but they can be made to last ten years or more. Emphasizing the space agency's interest, the official said they "must" be made to last that long.

• **Money and Corporate Courage**—In this survey, STEEL was told repeatedly that there is room in the field for any number of good companies. If you have the money and corporate courage, with the administrative ability to produce 100 per cent reliable products, the market is obvious. A spokesman for General Electric Co.'s Missile & Space Vehicle Dept., Philadelphia, put it bluntly: "Missiles are nothing more than an extension of conventional transportation. They will become as conventional as the airplane."

6.3 Million U.S. Cars in '60?

SALES OF domestic passenger cars in 1960 will be about 6 million to 6.3 million units, Herbert A. Boas Jr., vice president and director of marketing for Budd Co., Philadelphia, told the National Industrial Conference Board's seventh annual marketing conference in New York last week.

Sales of imported cars will be about 10 per cent as large as domestic, estimated Mr. Boas, bringing U. S. sales close to 7 million units.

• **Reasons**—Mr. Boas elaborated on the basis for his forecast:

1. "While 1959 has been a fine year for the industry, it's been fine only in relation to 1958. The last big year was 1955. Sales will be affected by replacement of some of those 1955 purchases."

2. "The tremendous growth of suburban and exurban population in the 16 to 25 year old group has created some three car families. Here in the East, where commuter railroads are fast withdrawing from our transportation system, many families are forced into two cars—one for the breadwinner, one for the bread buyer."

3. "The automobile has progressed to a necessity in our way of life. No longer is prestige a strong factor in the purchase of a certain make of automobile. The success of the two U. S. compact cars and small imported cars shows us that the American public wants basic, economical transportation with maneuverability in parking and traffic an important consideration."

4. "Today's way of life has given us more leisure time due to shorter workweeks and working days. The considerable improvement in turnpikes and roadway networks makes driving more pleasant, although there are notable exceptions around some metropolitan centers."

5. "Business, savings, and gross national product are at high levels. Unemployment is at a low level. Indicators of public opinion point towards a greater number of decisions to buy new cars in 1960 than we have seen in several years."

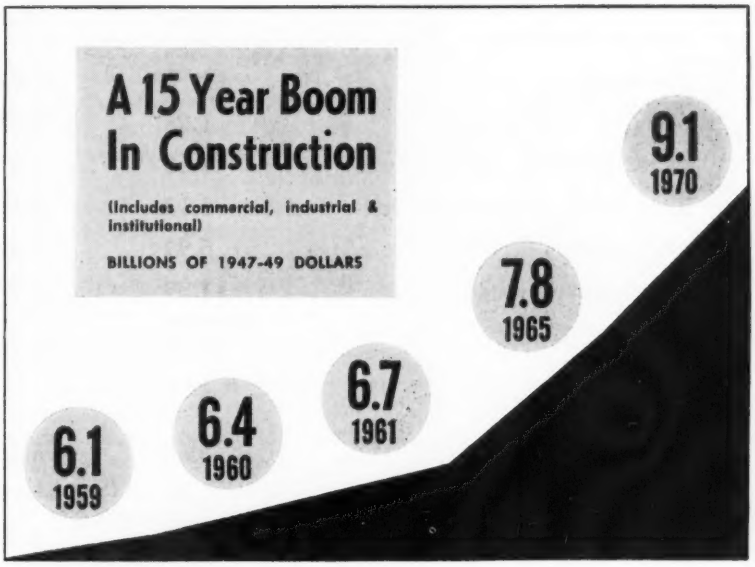
THE CAPITAL SPENDING **BOOM** BEGINS

Plant Spending Turns Up

INDUSTRY IS RIDING the uptrend of a new spending wave for industrial construction. Contracts awarded this year will be worth 65 to 70 per cent more than those awarded last year.

The prospects for 1960 are even brighter. STEEL checked with 14 big construction firms in six cities last week, found that the average company looks for 25 to 30 per cent more new business next year than it will get this year. It means that about $3.8 billion worth of contracts for industrial construction will be let next year. That compares with an estimated $2.95 billion this year and $1.75 billion last year.

Most sources look for the industrial building boom to taper off in 1961. *Engineering News-Record* predicts that the dollar value of industrial building in 1961 will be less than this year's.



Source: Associated General Contractors.

• **Why the Uptrend**—Two reasons are found for the revival: 1. Awareness of a need to update production facilities. 2. Realization that delay may mean incurring additional costs in a rising labor and materials market. Getting satisfactory completion dates may become a problem next year too.

• **Where the Uptrend**—The new industrial building boom is widespread. Even the chemical and petroleum industries, which had earlier been dragging their financial feet, are now loosening pursestrings. The steel industry is among the big spenders. One large contractor told STEEL he's getting more than three times as many new orders from the steel industry this year as last.

While the boom is accelerating faster in industrial building, a pickup is seen in other fields also (see graph above). Commercial building, a growing market for metalworking, is riding a strong spending wave. Nearly $2.3 billion worth of commercial building contracts will be awarded this year — one fourth again as much as last year. *EN-R* predicts that the value of commercial building contracts awarded next year will be 11 per cent greater than this year's.

• **Strike Is Felt**—Some builders are already feeling a pinch for structurals, especially smaller builders who had neither the money nor facilities to build large stocks; work will be curtailed on other projects if the strike lasts beyond Oct. 1. More than half the builders contacted by STEEL have large enough stocks to keep on schedule until mid-October; two say they can last into November. A few haven't noticed the inventory pinch because they're not permitted to work on field construction jobs in the steel industry while the strike is on. Most builders say there's plenty of wire mesh and reinforcing rods to go around, but that the structural market is getting dangerously tight.

• **Will They Buy Abroad?**—Most of the builders told STEEL that they wouldn't buy foreign steel because that would place them in an untenable position with their customers in the steel industry. However, some builders admit they'll buy the imported material if domestic shortages threaten to halt their projects. Several Detroit area builders reportedly have already switched.

• **Costs May Edge Up** — Detroit area builders figure they'll have to jack up their quotations by 3 to 5 per cent before yearend. Reasons: Local union wage increases and a new state business tax increase. New York, Pittsburgh, and Cleveland area firms say they probably won't hike prices unless there's a steel price increase. Chicago builders are divided on what they'll do.

You can expect building costs to climb if the USW wins a sizable wage increase. Reason: Builders would have to pay more for both materials and labor, since construction unions often follow the steel industry wage pattern. Most New York builders' labor contracts expire June 30, 1960. They're afraid that the unions will strike for a 20 cent package.

(For quarterly SEC-Commerce survey on capital spending, turn page.)

Capital Spending Plans Rise Again

(Billions of dollars, seasonally adjusted at annual rates)

	1959		1958	
	Oct.-Dec.	July-Sept.	Oct.-Dec.	July-Sept.
Manufacturing (Durable goods table below)	**13.72**	**12.81**	10.58	10.86
Mining	**1.06**	**1.04**	0.97	0.88
Railroads	**1.12**	**1.41**	0.58	0.63
Transportation other than rail	**2.12**	**2.19**	1.62	1.29
Public utilities	**5.93**	**5.80**	6.26	6.10
Commercial & others*	**11.39**	**11.04**	9.96	9.85
Totals	**35.34**	**34.29**	29.97	29.61
Durable goods†	**6.65**	**6.28**	4.86	5.16
Primary iron & steel	**1.35**	**1.15**	0.90	1.20
Primary nonferrous metals	**0.40**	**0.42**	0.34	0.35
Electrical machinery & equipment	**0.53**	**0.53**	0.44	0.43
Machinery except electrical	**1.11**	**0.99**	0.79	0.84
Motor vehicles & equipment	**0.63**	**0.68**	0.46	0.52
Transportation equip., except above	**0.38**	**0.37**	0.36	0.35

*Includes trade, service, finance, communication, and construction industries.

†Includes industries not shown separately. Nondurable goods not shown.

LOOK FOR U. S. business spending for plant and equipment this year to top the $33.25 billion mark, 9 per cent over the $30.50 billion level of 1958 and only about 10 per cent below the record $37 billion spent in 1957.

Business spending will reach seasonally adjusted annual rates of $34.3 billion in the current quarter and $35.3 billion in the last quarter, say the Securities & Exchange Commission and the Department of Commerce in a joint survey. Spending rates in the final two quarters of the year are now predicted at slightly higher levels than in the survey made in June, due chiefly to revised spending plans by trade groups and railroads.

• **Rail Spending Jumps**—Railroads now anticipate spending a total $1032 million this year, a 37 per cent jump over outlays last year. Railroads will match their 1957 record spending level of $1.4 billion (seasonally adjusted annual rate) in the third quarter, and will maintain a healthy rate of $1.12 billion in the last quarter.

Nonrail transportation companies will almost keep pace with railroad buying, anticipating a rise in outlays of 35 per cent over last year's. Record expenditures for new equipment by airlines account for most of the boost, although shiplines and trucking companies are also programing increased spending.

• **Metalworking's Pace** — Manufacturers' spending in the last quarter will be 30 per cent higher than the low point reached in 1958's last quarter. Total manufacturing spending this year will reach $12.44 billion.

Durable goods producers, in spending $6.02 billion, account for slightly less than half the total.

Primary iron and steel producers will spend $1.161 billion this year vs. $1.192 billion last year and $1.722 billion in 1957. Producers of primary nonferrous metals will spend $372 million this year vs. $441 million in 1958 and $814 million in 1957.

The only nonmanufacturing industry which is not scheduling an increase this year, electric utilities, will register a decline of about 4 per cent. Spending for the public utilities group will drop to $5.84 billion from 1958's $6.09 billion.

Michigan Gets Prescription

Group of economists takes a comprehensive look at depressed employment and fiscal headaches, suggests broad overhaul of state's business image

A NEW APPROACH to solving Michigan's financial and employment crises was offered last week in a report by three economists.

The project is headed by Prof. William Haber, University of Michigan economist. His associates are Eugene C. McKean and Harold C. Taylor, both of the Upjohn Institute for Employment Research, Kalamazoo, Mich., sponsor of the year-long study.

• They recommend:

Development of more than 1 million new jobs over the next 11 years to provide full employment for an expanding population.

Adoption by the legislature of an Economic Growth Act which would affirm the state government's interest in sound economic growth, create a state council of economic advisers, require the governor to deliver an annual report to the legislature on the economic condition of the state, and establish a joint Committee of the House and Senate on the Economic Report, with an independent staff to conduct hearings, make studies, and develop legislative proposals.

• Michigan's economy has been hardest hit by the growing efficiency and decentralization in the automotive industry.

Messrs. Haber, McKean, and Taylor cite four factors contributing to the state's employment troubles:

1. Industry Mix—"Manufacturing employment tends to fluctuate more rapidly than nonmanufacturing employment. Michigan has the third highest proportion of employment in manufacturing in the U. S. . . . Concentration of employment in any one industry tends to make the state reflect the ups and downs of that industry. Michigan's concentration in auto production is exceeded only by Oregon's in forest products and North Carolina's in textiles."

2. Shifts in Defense Procurement —The shift from wheeled vehicles toward aircraft, electronics, and missiles has cost the state heavily in employment. Estimates place the state's job loss in defense-related industries at 125,000 to 150,000 since 1953. (That includes part of the job loss in auto and auto-related industries which handled defense contracts.)

3. Auto Industry Decentralization —This reflects the continuation of a process which began as early as the 1930s, stemming largely from market considerations. Michigan would have felt its effects much earlier, had not the demand for cars been so strong in the postwar period. Michigan auto employment dropped from 395,000 in 1957 to 293,000 last year.

4. Efficiency-Lifting Capital Investment—From 1953 to 1956, capital expenditures in Michigan accounted for 9 to 11 per cent of the U. S. total. The authors point out that while that is a firm foundation for continued industrial importance for the state, the investment has made itself felt in the increasing number of cars and other goods which can be produced by the same number of workers. They report that the auto industry, which spent well over half its capital funds in Michigan during the postwar period, now has sufficient production facilities to make 10 million vehicles with no more workers than it had in 1955, when 9 million units were produced.

• In all manufacturing activity, Michigan lost at least 180,000 jobs during 1953-57.

That represents almost two-fifths of the entire loss of factory jobs in the U. S. Some major industry losses: Motor vehicles and equipment, down 108,000; other transportation equipment, down 20,000; nonelectrical machinery, down 16,000; fabricated metal products, down 14,000, and primary metal products, down 10,000. In nondurables manufacturing, the state picked up about 4000 new jobs while the nation lost 172,000 jobs in the same years.

• The Michigan economists estimate that about 38 of every 100 state residents must be employed in 1970 to equal the national level.

Only 33 per cent of the state's population now hold jobs. Estimating state population at 9.9 million by 1970, Messrs. Haber, McKean, and Taylor point out that 1,250,000 new jobs must be created to raise last year's actual employment of 2,580,000 to 3,830,000.

The authors forecast employment in Michigan automotive manufacturing in 1970 at 400,000—about the same level as the state had in 1956-57. If that estimate is accurate, Michigan will need an average of 25,000 new, nonautomotive factory jobs annually between 1958 and 1970.

The economists list these assets for the state in attracting new jobs: A high percentage of skilled, highly paid labor; less working time lost through work stoppages than the national average from 1955-58; abundant water supply for both industry and transportation. Liabilities, on the other hand, include a high degree of labor unionization; a geographical location off the beaten path of major East-West raillines and highways; higher taxes levied on business than in neighboring industrial states, including a Business Activities Tax and Annual Corporate Privilege Fee.

Finally, the authors outline these specific proposals for the state:

Initiate full scale research to determine those industries for which Michigan is best suited and encourage the development of more research facilities to attract scientific talent to the state.

Undertake a study of conditions of doing business in Michigan.

Study the state's business taxes.

Determine what staff the Department of Economic Development needs to carry on its industrial contactwork.

Encourage existing firms to reinvest capital and diversify product lines.

Make Michigan's transportation facilities completely adequate.

Lunik Outshines U. S. Again

THE DRAMATIC landing of man's first moon rocket again raises the question of Russian supremacy in space. Many European scientists are hailing it as a colossal achievement, but some of our space people aren't going that far. They insist that the venture should be viewed in its proper perspective.

Dr. T. Keith Glennan, chief of the National Aeronautics & Space Administration, the civilian arm of our space effort, notes that the 860 lb package which hit the moon "should not be related to accuracy in the delivery of atomic warheads." Dr. Herbert F. York, director, Defense Research & Engineering, says: "It has no military meaning."

The Russians may have had a guidance system in the final stage and presumably some sort of power system to take directions from it, unless guidance was done through infrared techniques. The thrust of the whole vehicle must be about twice that of our Atlas. Dr. York notes that U. S. attempts to hit the moon have failed because we didn't have sufficient thrust to carry a guidance system in the last stage.

We Will Try the Same Feat

NASA will attempt to orbit the moon with a payload sometime this fall. From official Russian sources, it appears they planned to hit the moon, not orbit it. Our scientists say it is more difficult to orbit because a "precise velocity" must be maintained and retrorockets fired at exactly the right time to send a satellite into orbit.

The failure of Mechta (or Lunik I) in January and Pioneer IV in March to hit or orbit the moon must be put down as a guidance failure. The success of last week's Lunik II must be counted as evidence that the Russians have solved the guidance problem. Mechta, with a thrust of 580,000 lb, and Pioneer IV went into orbit around the sun. In orbit, Mechta weighs 3245 lb compared with Pioneer IV's 13 lb.

The reduction in weight from over 3000 lb in Mechta to 860 lb in Lunik II may partially account for Russia's success, but all the evidence points to a highly sophisticated guidance system.

Glennan Warned Us of Our Failures

Lunik II points up a speech by Dr. Glennan before a missile symposium in Los Angeles. He said: "We have learned that we are not nearly as far advanced in space technology as we had thought or hoped. Our experiences in the space vehicle field have been less than completely satisfactory. The ratio of successful launches to what some have termed successful failures has not improved much in the last year."

He warned: "In thrust capability, in guidance-injection, midcourse and terminal, in thrust control, there is much that must be learned and applied before we understand the difficult missions we all talk about so glibly."

When Can Man Land on the Moon?

Listen to Dr. Glennan: A man with the minimum amount of equipment (weighing about 1 ton) would need a rocket with 300,000 lb thrust to get him close to the moon, but the weight of the fuel needed to land him would triple the thrust needed—to about 900,000 lb. To get him back safely on earth, you'd have to multiply that figure by about five to roughly 5 million lb. The biggest rocket under development by NASA has a thrust of about 1.5 million to 2 million lb. As far as the first American citizen landing on the moon is concerned—well, you can see how far away we are from that. The Russians? They have already exhibited the ability to build rockets with over 500,000 lb of thrust.

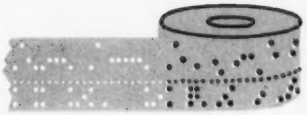
Survey Holds Up Disposal Program

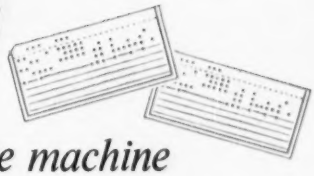
J. Roy Price, assistant director, Office of Civil & Defense Mobilization, reports disposal plans for surplus minerals and metals in the government's stockpile will have to await a new study of OCDM, to be completed by the end of 1960.

Holding out some hope for worried producers of the strategic metals (who could be hard hit if the government decided to rid itself of some $3 billion worth of material), Mr. Price hinted that OCDM's current thinking involves the concept of rehabilitation after an atomic attack.

Experts who have claimed the stockpiles should be sold have argued that they wouldn't be of any use after an atomic attack. Reason: Because we would have to fight with what we had, not what we could produce after the initial attack. Now it appears the agency wants the surpluses on hand after an emergency would end to help put the country back on its feet.

Congressional criticism of moves to sell surplus copper earlier this year, and a few tons of titanium sponge this month, has been severe.





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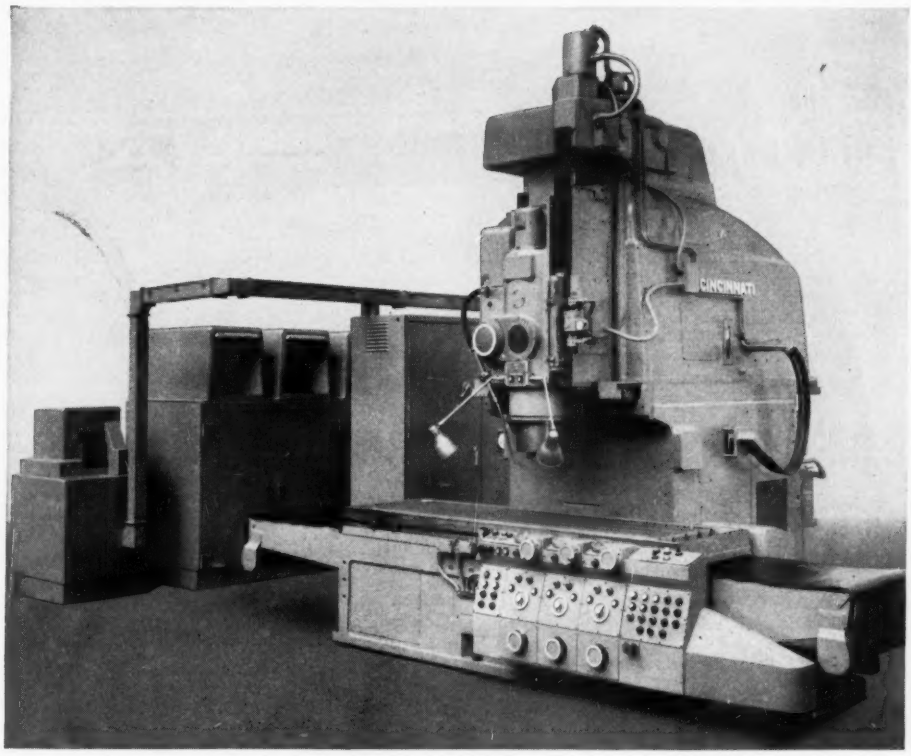
gives you positive COST CONTROL *at the machine*



CINCINNATI *30" Vertical Hydro-Tel Milling Machine, 60" table traverse, equipped with CNC. Two cabinets at far left house numerical control equipment.*

No more "cut and try" for machining operations. No change in setup for rough and finish cuts, new and reground cutters, right- and left-hand parts. No operator fatigue near the end of the shift. These are some of the ways in which Cincinnati Numerically Controlled (CNC) Machine Tools give you positive cost control.

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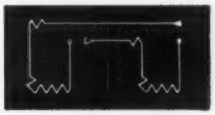
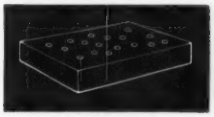
The Cincinnati Milling Machine Co., Cincinnati 9, Ohio



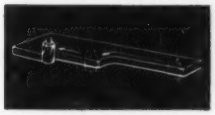
SEQUENCE CONTROL

CNC assures reliable automatic selection of feeds, speeds, spindles, coolant flow and other auxiliary machine functions.



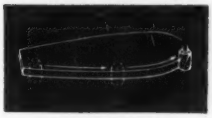
POSITIONING

Tool-work positioning is fast, accurate. CNC eliminates expensive jigs, fixtures; reduces setup time.



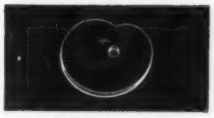
STRAIGHT LINE CUTS

Multiple straight line cuts to exact length, and with abrupt changes in direction, can be programmed, set up and run in a fraction of the time required using conventional methods.



CONTOURING

CNC greatly reduces lead time in reproducing complex, contoured parts; eliminates need for expensive templates, masters.



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UK Steel Exports by Countries

(% of total)

Market	1958	1956	1954	1937-38 Average
Canada and Newfoundland	7.2	11.3	6.1	6.9
Other British Dominions	26.2	33.0	36.2	37.2
UK Colonies	17.6	15.4	17.1	11.4
Scandinavia	13.3	12.7	14.6	7.9
U. S. and dollar account countries	7.0	6.3	4.1	0.7
ECSC	6.1	4.9	6.4	4.8
Other Western Europe	5.0	4.7	3.6	3.7
Argentina and Brazil	5.6	2.3	2.9	8.5
Soviet Bloc	3.4	0.9	0.4	4.1
Other Countries	8.6	8.5	8.6	14.8

British Steel Starts Out Of Recession; '65 Goal Set

THE BRITISH iron and steel industry, fourth largest in the world, is on the road to recovery after a recession in which production slid to 75 per cent of capacity.

The industry, topped only by the U. S., Russia, and West Germany in size, is still operating at only 80 per cent capacity. But it appears that users have stopped liquidating stocks of most products. Some firms which have been out of the market for several months are again showing interest. Despite the note of optimism, there's little agreement about the rate at which stocks will be rebuilt.

• **Autos Use Most**—The auto industry continues to be the largest consumer. It held up well during the slack period largely due to an expanded export market. However, a strike at British Motors Corp. Ltd., Cowley, Oxford, is bound to affect current shipments.

Construction is booming; the principal activity is in home building. Heavy engineering industries are doing well. The most active area is the heavy electrical equipment field where contractors are busy making powerplant equipment for export. Wire and cable industries are also benefiting from the growth in the electrical field.

• **Some Laggards**—Some slow spots are still evident. Railroads, due to economy cuts by the British Transport Commission, have taken 30 per cent less steel this year than in 1958. Shipbuilders, though active, are anxious to build new business due to the increase in world shipping and keen competition.

The mining industry is quite depressed and is not likely to buy much steel in the near future. Partly due to the conversion to oil and accentuated by a hot summer, coal stocks have soared to 32 million tons compared with 13 million tons a year ago. Output thus far in 1959 is 5 million tons below 1958's. The government is continuing its efforts to close inefficient and depleted mines. It hopes to shut 30 to 60 more collieries next year. Upped oil use has boosted demand for tube and line pipe.

• **Steel Exports Significant** — Steel exports have helped to keep British mills active. They accounted for 54 per cent of the UK's total exports in 1958. The large percentage is attributed to a concerted sales effort and enlargement of facilities since World War II to meet foreign demand. Although iron and steel products (except forgings and castings) face maximum price limits by the Iron & Steel Board, steel's government control body, no such control is exerted over prices of exported goods. However, export prices have remained reasonably stable and British steelmakers point out they are not so flexible as prices quoted by some of their leading competitors in foreign markets.

• **Outlook** — Industry observers do not expect steel demand to exceed 32.5 million tons before 1965. Expansion is continuing at a reasonable rate to meet that demand. Capital spending reached record levels last year and is not expected to slacken this year.

The Labor Party believes private industry and the Iron & Steel Board are underestimating steel requirements. It is using that argument as one of many to push for the full renationalization of the steel industry (see STEEL, June 8, p. 61). Although such a possibility is not to be ignored, it is not likely in the near future, say inside sources.

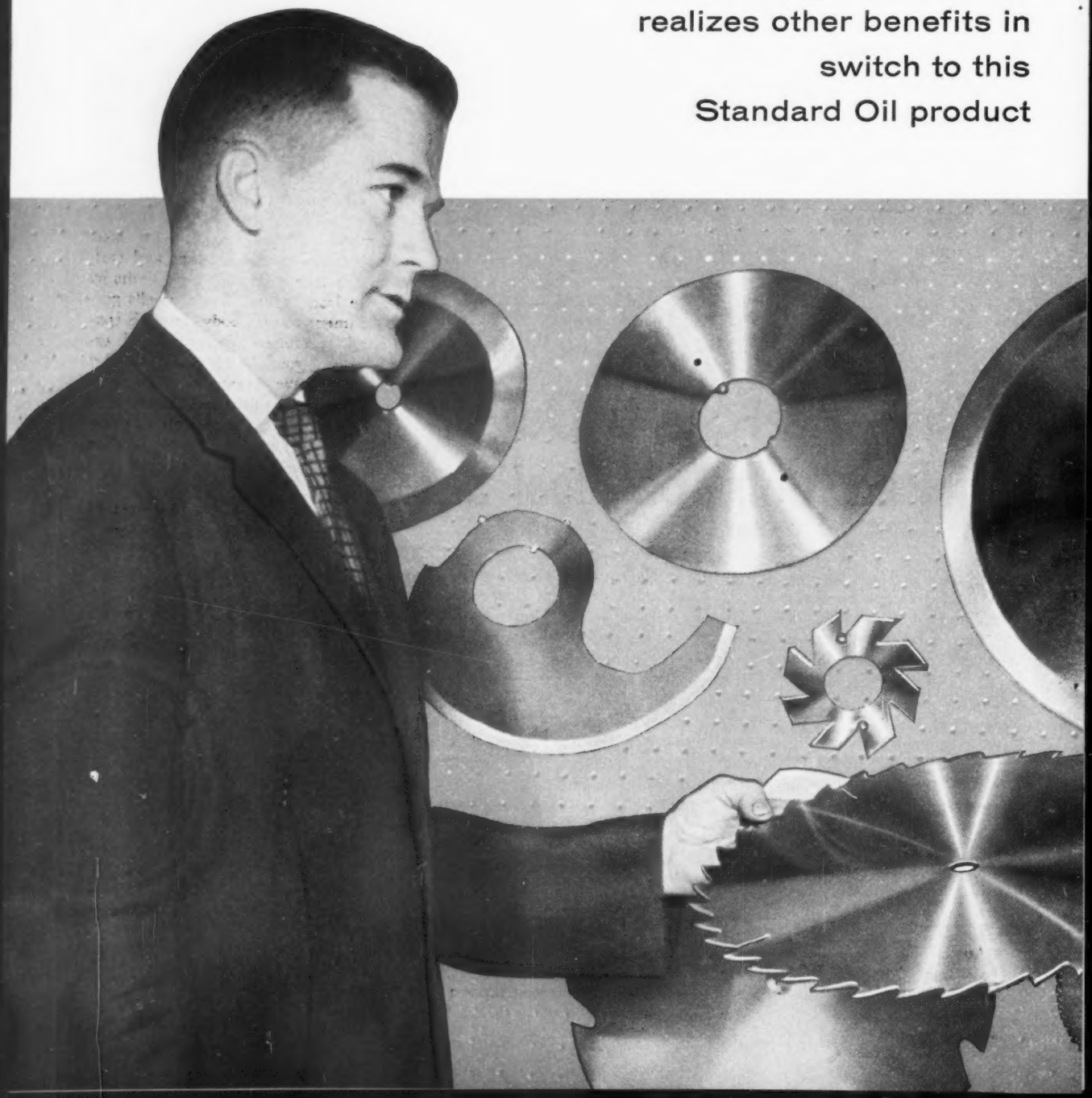
Overseas development of raw materials is underway. While the UK is self-supporting in coking coal, the nation's ore fields are becoming exhausted. What remains tends to be of low quality.

Gets 40% savings in coolant costs by change to

Standard's Transparent Coolant

ARGON Oil No. 4

Chicago Saws, Inc., realizes other benefits in switch to this Standard Oil product

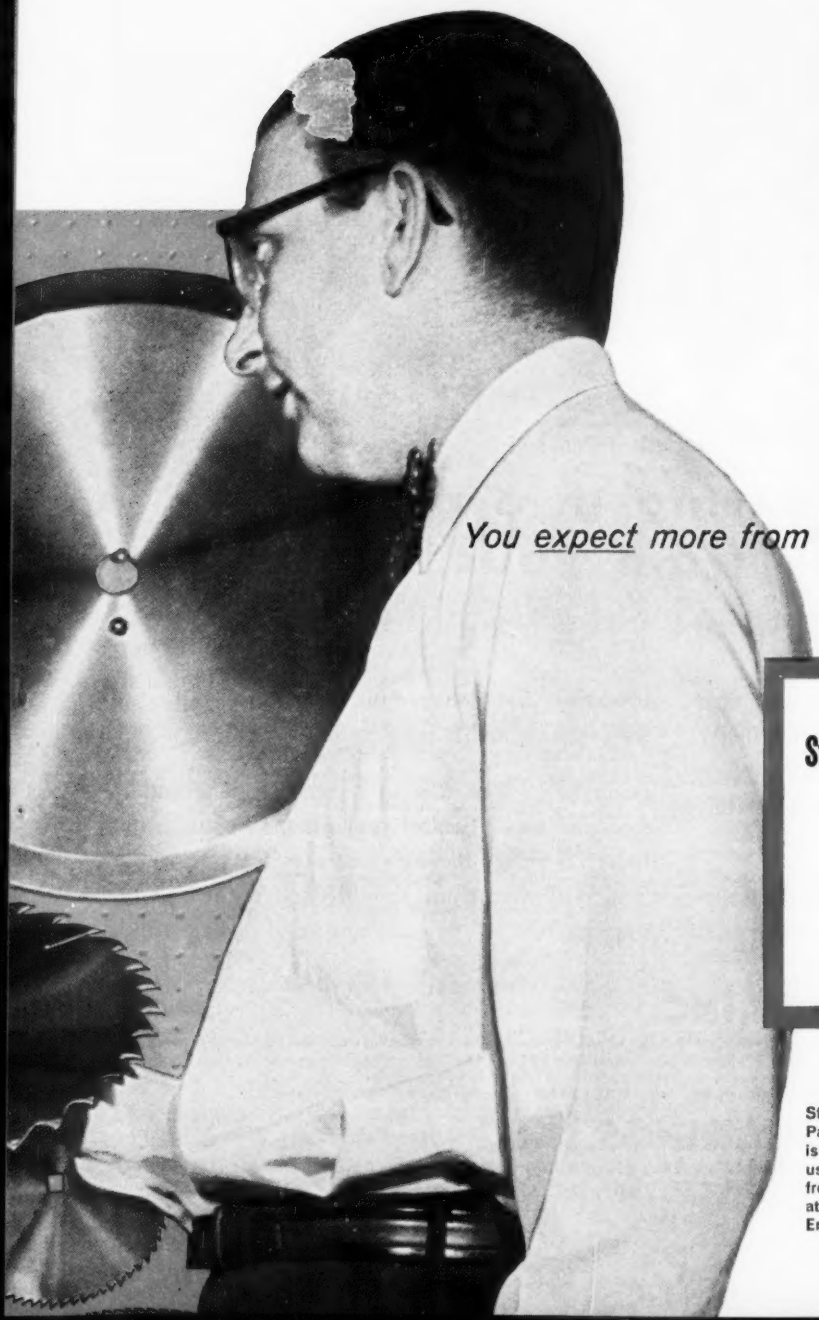


Situation: It all started when a Standard Oil lubrication specialist recommended ARGON Oil No. 4, Standard's transparent coolant to Chicago Saws for use in their grinding operations. This manufacturer of rotary saw blades decided to give it a try. They knew the product was the result of more than three years' work in Standard's research laboratory, and that it had been extensively field tested.

What happened: Using ARGON Oil No. 4 in 100:1 concentration, Chicago Saws was able to reduce coolant costs 40%. They also found the work could be seen more clearly when using this coolant. There was less wheel loading. They also discovered the coolant didn't foam and that its exceptional ability to carry off heat resulted in cooler operation. Faster cuts were obtained with finer wheels. Tolerances were easier to hold. Better finishes were obtained. Wheel dressings were less frequent.

What you can do: Get more information about ARGON Oil No. 4 transparent coolant. Call the Standard Oil lubrication specialist near you in any of the 15 Midwest or Rocky Mountain states. Or write: **Standard Oil Company (Indiana), 910 South Michigan Avenue, Chicago 80, Ill.**

Using ARGON Oil No. 4, Chicago Saws gets better finish at savings of 40% over other coolants tried. Operator is using .004" cut on heat treated Rockwell 60 C steel.



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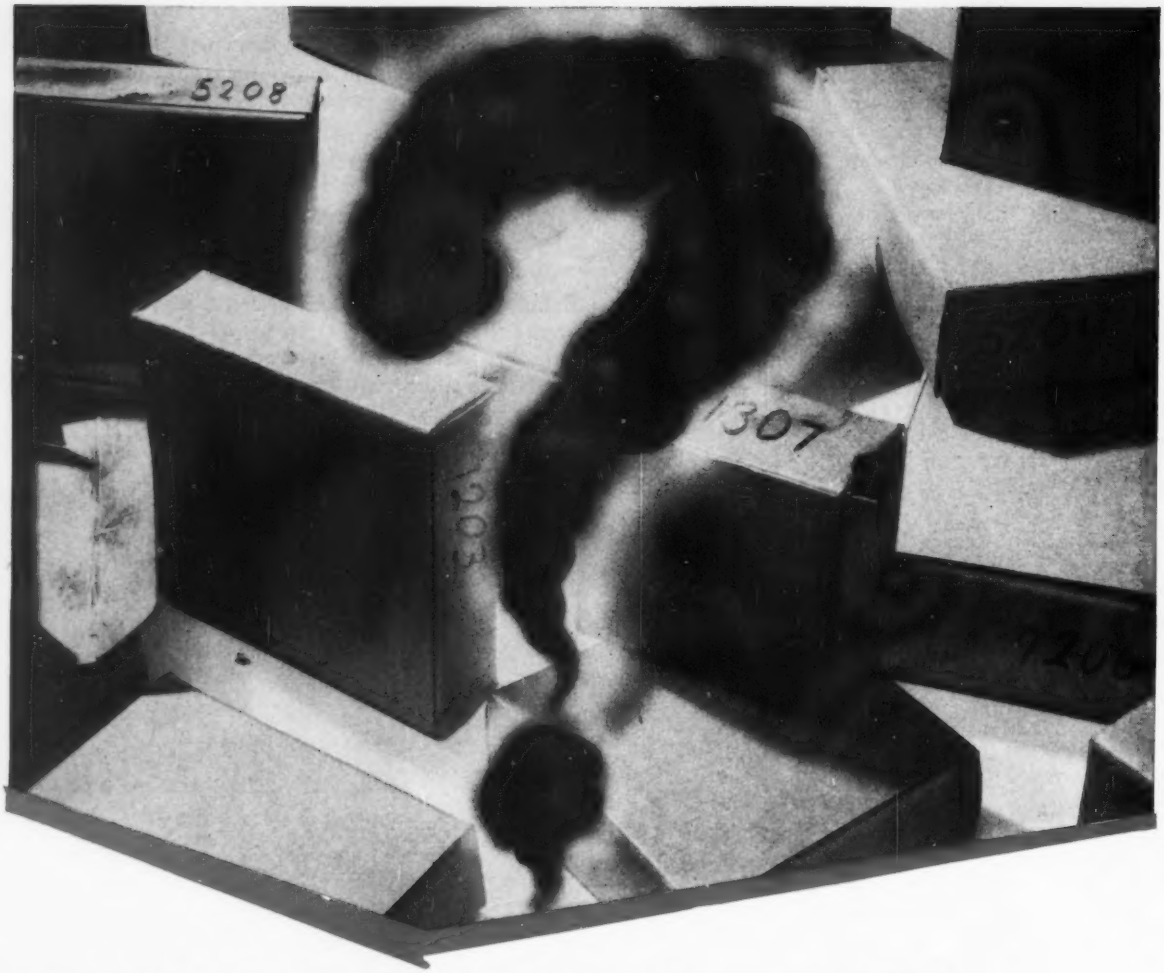
Quick facts about

Standard's Transparent Coolant

ARGON Oil No. 4

- Clear, transparent fluid
- All chemical. Does not support bacteria growth
- Unaffected by humidity
- Nonfoaming
- Fire resistant
- Odorless

Standard's Bob Stark and Chicago Saws' vice president Paul Bostrom discuss blades and coolants. Bob Stark is well qualified to work with manufacturers on the use of metalworking coolants. Bob has a chemistry degree from Illinois College plus three years' experience at Standard. He has completed the Standard Oil Sales Engineering School course.



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S-P Bets on Lark, Diversification

DESPITE Studebaker-Packard Corp.'s confident entry into the 1960 auto arena, the 107-year-old vehicle builder still has problems. The biggest one next year will be competition from Big Three economy cars. Another is an apparently widening rift in the relationship between S-P and Daimler-Benz AG. The South Bend, Ind., firm's apparent solution: More diversification.

Right now, the future looks rosy. Instead of the $11 million and $13 million losses chalked up in 1957 and 1958, it looks like Studebaker may show an $18 million net operating profit for 1959. Harold Churchill, president, says he wants 3 per cent of next year's domestic car sales. That adds up to 195,000 units, but Mr. Churchill is reported as saying privately he'll settle for less. Present production schedules program 170,000 cars for next year. Even that would be at least 20,000 units above this year's anticipated deliveries.

Studebaker's convertible is only compact softtop; it will list for $2480—deliver for about $2700

• **Sales Aids**—Fleet sales are expected to boost Lark registrations. Some 10,500 Larks have been sold to fleets so far this year. S-P's sales crew expects to double that figure in 1960. The Econ-O-Miler taxicab should help. It's almost a foot longer than regular Larks and 4 in. shorter than Checker cabs. Studebaker has sold 1600 cabs, anticipates better than 3000 sales next year.

The 1960 Larks are little changed from 1959 models in accordance with Mr. Churchill's version of the compact car philosophy: "We offer modern styling and consistency of design to deliver high resale values rather than deliberately planned obsolescence."

Improvements in mechanical design are cited as performance aids by Eugene Hardig, chief engineer: A new carburetor, improved heads, and a modified torque converter. Electric wipers will be standard on some models. Legroom and seating heights are slightly better.

• **New Models**—A four door station wagon will be introduced. More important in the opinion of Sidney Skillman, sales vice president, will be the introduction of a Lark convertible. Anticipated factory list price will be about $2480, some $200 less than the lowest price softtops offered by Ford, Plymouth, and Chevrolet.

Controlled changes mean tooling costs are slight. One estimate is that Studebaker has spent less than $3 million to bring out the two new models and handle the changes in transmissions and engines. That includes $1.5 million spent since August to rearrange and modernize equipment and install a new paint line.

Studebaker is building 84 Larks an hour on a straight time, single shift basis. Mr. Churchill says it can double its hourly capacity without adding to plant space. The company isn't worried about steel either. It can build at the rate set right up to Dec. 1.

• **The Joker**—It's evident that the expanding market will help Lark next year.

Studebaker's breakeven point reportedly is around 130,000 cars and its lower costs give it an advantage profitwise over Big Three entries.

But as the new compact cars pay off tooling costs and gear up dealers, Lark will have to dig deep to compete. The company's 2800 dealers are expected to adopt the 21 per cent discount Chevrolet has initiated for Corvair dealers. Even so, it looks like delivered prices will be slightly higher than Corvair, Valiant, and Falcon. That price disadvantage can squash sales to buyers who want savings in initial price as well as in operation.

Autodom thinks that Lark, like Rambler, should be plowing some of its profits back into development of different design changes that will keep it ahead of and different from competition. It's doubtful that a simple facelift in two or three years will help. Studebaker apparently has no such program underway, although Rambler is inves-

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tigating several possibilities, including an aluminum engine and electrically powered cars.

• **What to Do**—Studebaker's ultimate success appears to lie in becoming so well diversified that it can survive regardless of what eventually may happen to Lark. The company already has acquired two firms.

One is Gering Products Inc., Kenilworth, N. J., a manufacturer of plastic compounds, polyethylene film, plastic garden and industrial hose. It reportedly should show a 30 per cent profit increase next year.

A more recent purchase is C. T. L. Inc., Cincinnati, a plastics research and manufacturing organization which has pioneered the solution of ultrahigh temperature problems of space travel. C. T. L. is participating in the Astronaut project.

William Mewhart, S-P's newly elected vice president of diversification, is busily investigating other durable goods firms, including diecasting companies and several companies that fabricate high strength metals, like titanium and zirconium. Mr. Mewhart also is reported to be looking at hardware and household appliance manufacturing firms.

• **D-B Peeved?**—More diversified interests may be needed fairly quickly. Studebaker's relationship with Daimler-Benz AG appears shaky. The German manufacturer sells its Mercedes luxury and sports cars through Mercedes-Benz Sales Inc., a wholly owned Studebaker-Packard subsidiary. M-B Sales Inc. also has started handling the economy line of DKW imports.

Although the subsidiary has some 700 exclusive Mercedes outlets, it merchandises most of the imports through Lark dealers. Two Daimler representatives have indicated to STEEL that their company would like to split the luxury cars entirely away from Lark dealers because they feel an economy car salesman "doesn't understand and isn't equipped to sell a luxury product." One way to do that would be to get control of Mercedes-Benz Sales Inc., set up a completely separate distribution network. Whether it happens or not, that kind of talk makes Detroit feel the Mercedes-Lark togetherness won't be lasting.

There's little doubt that Lark will continue to show a profit in the expanding economy car market. But when economy cars need a costly facelift, Larks will really be under the gun. Look for S-P to diversify further in the next two years to avert any possible crisis.

Chrysler Has New Engine

Chrysler Corp. confirms STEEL's earlier reports that 1960 cars will be using a newly designed six cylinder engine, a ram induction system for V-8 engines, and a lighter weight, three speed automatic transmission.

The six cylinder powerplant has a 225 cu in. displacement and a cast iron block. Aluminum is used for the intake manifolds as well as in the distributor and pump housings. The engine is canted 30 degrees to the right. Chrysler says that provides a lower center of gravity and reduces vibration. Compression ratio is reported to be 8.5 to 1 and the engine will turn out 145 hp at 4000 rpm. For easier maintenance, air cleaner, carburetor, manifolds, water pump, and generator are on the left side of the engine. Sparkplugs, distributor, oil pump, filter, and fuel pump are on the right.

For those who still want hot performance, Chrysler engineers have developed a ram manifold which gives the effects of supercharging without having to use a regular supercharger with its close tolerance, rotating components. The ram manifold uses sonic pulsations in 30 in. intake tubes to force additional fuel-air mixture into combustion chambers. It provides enough extra boost in the midspeed range so that kickdown gears are not needed for passing. The device obviously will be used only on V-8 engines.

Aside from its new six cylinder powerplant, displacement and torque characteristics of other Chrysler engines are relatively unchanged. Aluminized intake valves will be used to extend valve life. Fuel economy is better on V-8s because the company is using a three stage piston in the carburetor linkage to control the automatic choke during warmup.

Chrysler's lighter automatic transmission has been designed specifically for use with the canted six cylinder engine which is slated for the Valiant, Plymouth, and the Dodge Dart. It's basically the same as the company's Torqueflite transmissions, but will use more aluminum in the transmission cover and torque converter housing. Chrysler also adapted its manual transmission to get extra economy out of its six cylinder engine. A heavy duty straight stick with special high torque characteristics will be available for high performance V-8s.

U. S. Auto Output

Passenger Only

	1959	1958
January	545,757	489,515
February	478,484	392,132
March	576,085	357,048
April	578,825	316,594
May	546,817	349,613
June	557,994	337,446
July	555,418	321,017
August	238,773	180,447
8 Mo. Totals	4,078,153	2,743,812
September		130,460
October		261,701
November		514,152
December		593,920
Total		4,244,045

Week Ended	1959	1958
Aug. 15	72,603	59,677
Aug. 22	31,848	25,918
Aug. 29	18,335	16,771
Sept. 5	17,261	12,314
Sept. 12	22.797†	24,072
Sept. 19	40,000*	37,150

Source: *Ward's Automotive Reports.*
†Preliminary. *Estimated by STEEL.

Diecasting Output Climbs

Production of zinc diecastings by members of the American Die Casting Institute is expected to reach 310,000 tons this year vs. 252,000 tons last year.

Aluminum diecasting output should total 390 million lb vs. 290,250,000 lb in 1958, says the institute. Its estimate is based on an anticipated passenger car output of 6.5 million units and no further labor trouble in the metals industries.

Taking the dimmest view of car production and the labor situation, the ADCI forecasts minimum production of 275,000 tons of zinc diecastings and 370 million lb of aluminum diecastings this year.

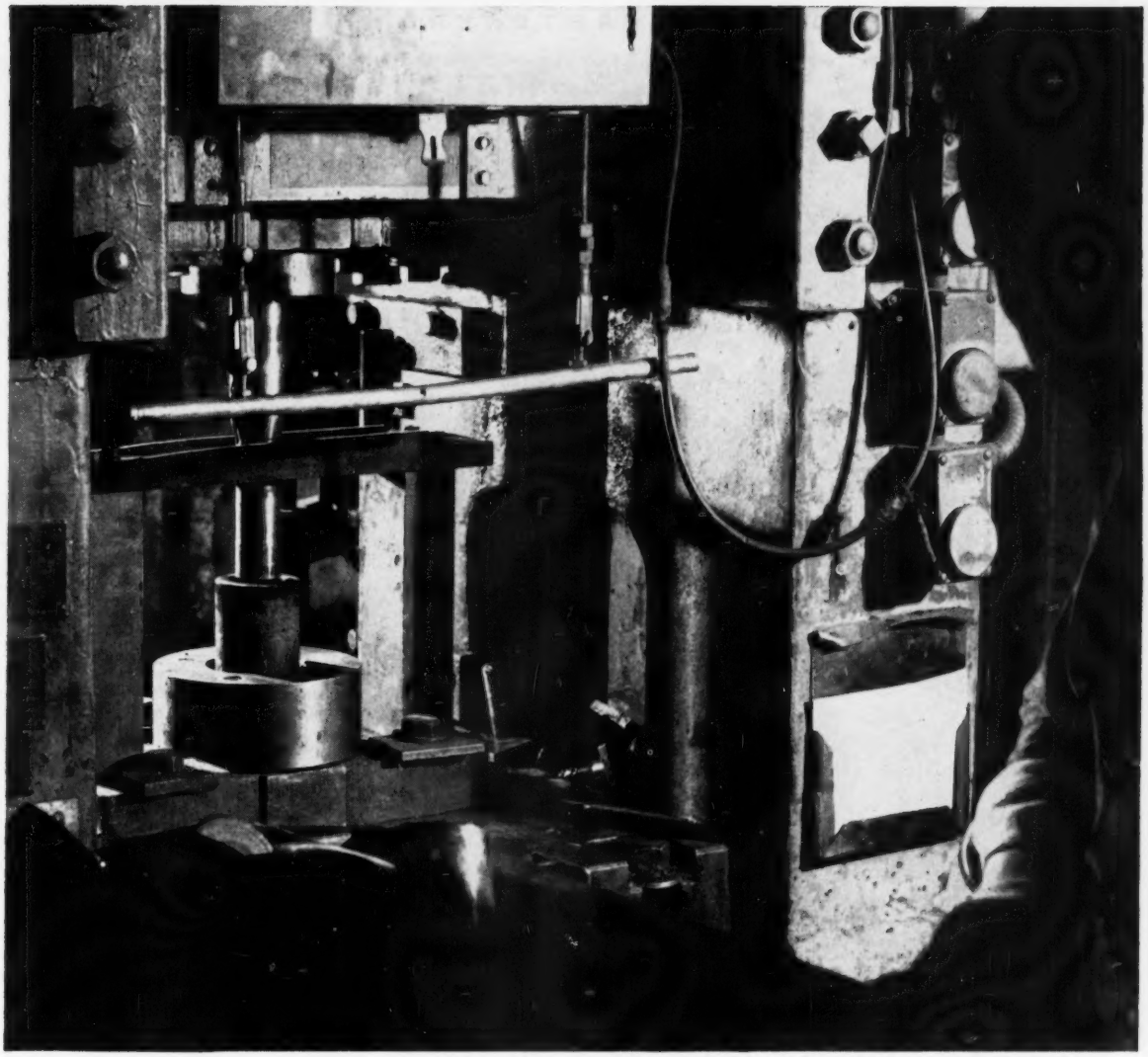


Photo courtesy of Heintz Division, Kelsey Hayes Company

HIGH PRODUCTION cold extruding proof of Aristoloy uniform quality

High-speed production of cold extruded parts like this track link bushing for a midwest equipment manufacturer can not tolerate variations in quality. Physical and chemical uniformity are all-important if costs are to be kept in line and rejects eliminated.

Aristoloy 8620 electric furnace steel meets the high quality requirements of Heintz Division of Kelsey Hayes Company and its customers.

From the melt shop to rolling and finishing operations, careful control guarantees that delivered bars will meet the most rigid standards of quality.

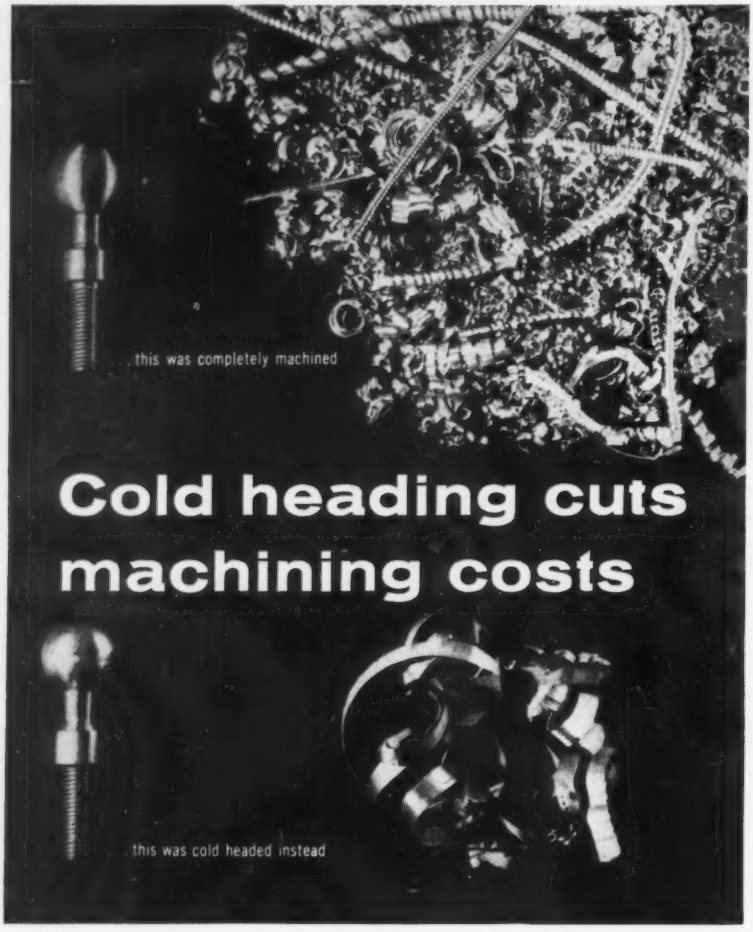
For complete information about Aristoloy leaded or standard carbon, alloy and stainless grades, call the Copperweld representative in your nearest large city. Or write today for NEW PRODUCTS & FACILITIES CATALOG.

ARISTOLOY STEELS

COPPERWELD STEEL COMPANY

ARISTOLOY STEEL DIVISION • 4005 Mahoning Ave., Warren, Ohio • EXPORT: Copperweld Steel International Co., 225 Broadway, New York 7, N. Y.

ECONOMIC FACTS ON FASTENERS



- **Buy cold headed parts . . . produced with less scrap, in less time than machining**
- **You get stronger items, in one piece, at big savings**

Above you see an automotive part formerly machined, along with scrap turnings. Compare with the piece below—where metal has been forced to cold flow into shape in one of RB&W's cold heading machines. (That's the same equipment that produces RB&W bolts, thousands per hour, at rock bottom cost.)

It's obvious that cold headed parts save money. (Little or *no* scrap loss, faster production.) Not so apparent is the fact that the cold headed piece is actually *stronger*, too. The cold working does it. Also gives a better finish and oftentimes closer tolerances.

Cold headers used for fasteners can be adapted to almost any small parts now machined or forged as one or more pieces. That's where an expert can help you. Avail yourself of the RB&W Fastener Man to analyze your requirements. People who have already done so are profiting from RB&W's vast cold heading facilities and ability to supply large volumes at substantial savings. Russell, Burdsall & Ward Bolt and Nut Company.

R B & W
115th year

Plants at: Port Chester, N. Y.; Coraopolis, Pa.; Rock Falls, Ill.; Los Angeles, Calif. **Additional sales offices at:** Ardmore (Phila.), Pa.; Pittsburgh; Detroit; Chicago; Dallas; San Francisco. **Sales agents at:** Milwaukee; New Orleans; Denver; Fargo. **Distributors from coast to coast.**

Superior joints in heavy duty products

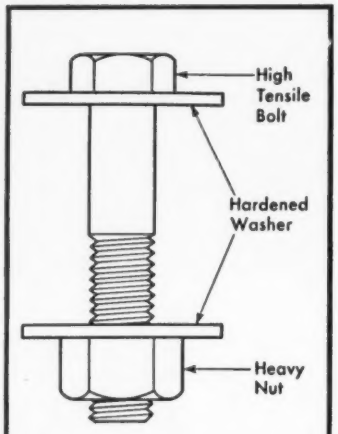
. . . achieved with RB&W High Strength Bolts

Plenty of experience now proves you can stop fastener failures with high strength bolts. Especially in products subjected to much vibration in service. Properly tightened, these bolts make the joints not only *permanently* tight, but *stronger*.

Here's why: A joint is only as strong as the *residual tension* left in fasteners after tightening. The more you tighten, the better it is.

RB&W High Strength Bolts allow a high level of tightening. Friction between bolted surfaces increases with the tightening, so that slippage of the joined members against each other can't take place. This makes the joint better able to resist external forces which try to shear or separate the joint.

In addition, with high residual tension, these fasteners are also more immune to the fatiguing and loosening effects of loads which constantly vary, such as vibration.

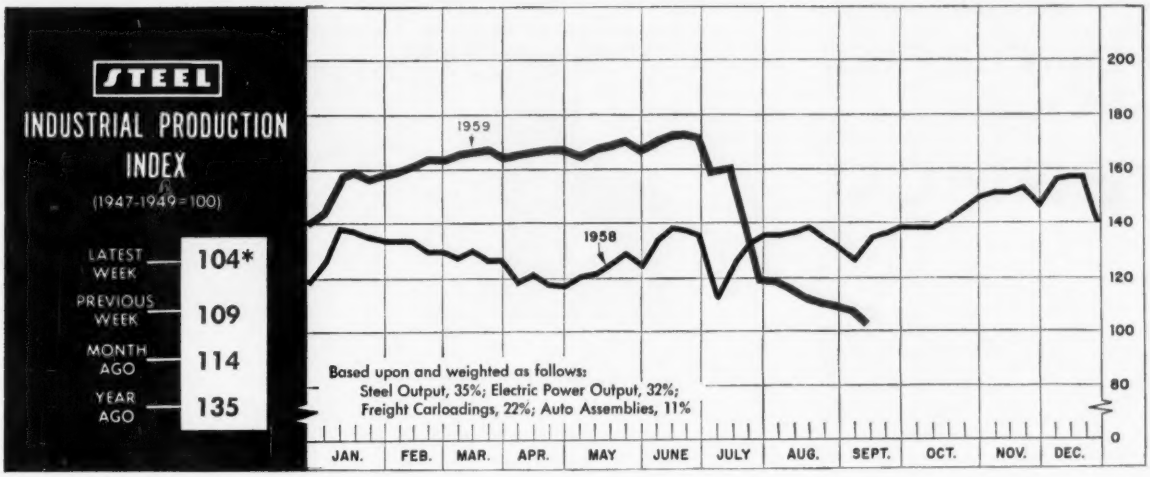


RB&W High Strength Bolts conform to ASTM A325. They're made of a selected grade of high carbon steel for proper balance of hardness and ductility. Use of hardened washers distributes their high clamping force over larger area.

As a result, one manufacturer of heavy duty shaker equipment has found them the only answer in troublesome joints which formerly required constant maintenance. Others are ending rivet failure and costly replacement in cranes, ore unloaders and freight cars with RB&W High Strength Bolts.

If you're making similar or related heavy duty equipment, talk it over with an RB&W Fastener Man.

RB&W FASTENERS—STRONG POINT OF ANY ASSEMBLY



*Week ended Sept. 12.

Profits Head for Record in '59

IF PROFITS in the fourth quarter come up to the expectations of many businessmen, the year as a whole will be the best on record. The only question is the ability of primary metal producers to offset strike losses during the remainder of the year.

The best year on record for net corporate profits after taxes was 1956 (the figure, $23,456 million). Corporate earnings in the first quarter of '59 were running at an annual rate of $23.8 billion. The second quarter pace should be even better. The quarterly survey of 808 leading corporations by the First National City Bank of New York showed that net income in the period was 15 per cent higher than the first quarter figure. The first half was 56 per cent ahead of the corresponding period of 1958.

• **Borrowed** — Most businessmen recognize that some of the gain, especially in the second quarter, was at the expense of the third quarter because of the inventory buildup in steel and nonferrous metals. They also feel that some of the current losses of primary metal companies will have to be made up in the fourth quarter if they are to realize their expectations for the year as a whole. But even if this segment of the economy falls short, chances for an over-all record are still good because of the strength in other durable and nondurable goods industries.

At this stage of the game, one thing is sure: The economists were short on their predictions of 1959 profits, just as they were short on about everything else in this rapid recovery. At about the turn of the year, they believed net corporate income of $22 billion was likely. While that would be about $4 billion better than the 1958 mark, it would still be only the fifth best year in history.

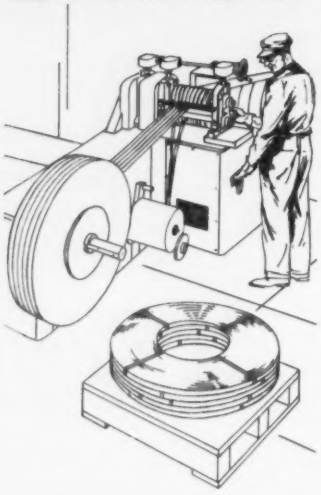
• **Things to Come**—Here is what some metalworking companies think

BAROMETERS OF BUSINESS

	LATEST PERIOD*	PRIOR WEEK	YEAR AGO
INDUSTRY			
Steel Ingot Production (1,000 net tons)[2]	345[1]	327	1,771
Electric Power Distributed (million kw-hr)	13,400[1]	13,759	12,248
Bituminous Coal Output (1,000 tons)	7,325[1]	7,255	7,104
Crude Oil Production (daily avg—1,000 bbl)	6,800[1]	6,785	7,009
Construction Volume (*ENR*—millions)	$338.8	$490.1	$360.7
Auto, Truck Output, U. S., Canada (*Ward's*)	36,649[1]	33,275	32,097
TRADE			
Freight Carloadings (1,000 Cars)	450[1]	544	666
Business Failures (Dun & Bradstreet)	308	257	191
Currency in Circulation (millions)[3]	$32,107	$31,932	$31,433
Dept. Store Sales (changes from year ago)[3]	+20%	−7%	+2%
FINANCE			
Bank Clearings (Dun & Bradstreet, millions)	$18,116	$23,093	$20,237
Federal Gross Debt (billions)	$290.2	$290.4	$278.3
Bond Volume, NYSE (millions)	$27.3	$27.0	$24.7
Stocks Sales, NYSE (thousands of shares)	11,139	11,576	15,731
Loans and Investments (billions)[4]	$104.9	$105.2	$94.3
U. S. Govt. Obligations Held (billions)[4]	$29.1	$29.3	$32.7
PRICES			
STEEL's Finished Steel Price Index[5]	149.96	149.96	246.65
STEEL's Nonferrous Metal Price Index[6]	222.6	220.4	198.8
All Commodities[7]	119.3[1]	119.3	119.0
Commodities Other than Farm & Foods[7]	128.3[1]	128.3	126.1

*Dates on request. [1]Preliminary. [2]Weekly capacities, net tons: 1959, 2,831,486; 1958, 2,699,173. [3]Federal Reserve Board. [4]Member banks, Federal Reserve System. [5]1935-39=100. [6]1936-39=100. [7]Bureau of Labor Statistics Index, 1947-49=100.

WHAT'S
DIFFERENT
ABOUT
BRMCO



Pride of workmanship makes BRMCO aluminum, brass or bronze the quality material that can speed your production line, providing fewer rejects, longer tool life and less waste. With BRMCO metals, uniform quality of temper, gauge, width and grain size result in greater efficiency and lower metal working costs.

From the first analysis of raw materials right through casting, rolling, annealing, slitting and finishing operations, BRMCO's skilled craftsmen maintain standards that produce metals meeting the most exacting specifications. Holding a temper tolerance to within plus or minus three points on the Rockwell Scale is only one example of the ability of BRMCO's people.

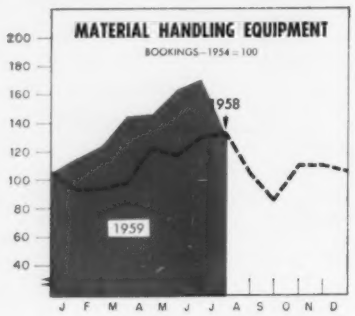
Quality control at BRMCO assures a steady flow of uniform material to your production line, and BRMCO service supplies that metal on the exact date you specify.

We'll be happy to send you samples for your own testing and analysis. Simply write, or call collect.

BRMCO

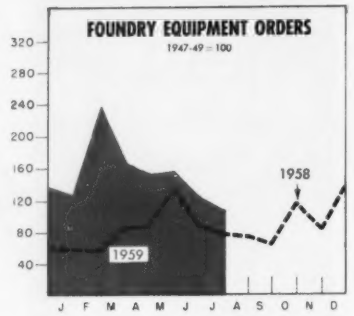
Bridgeport Rolling Mills Company
BRIDGEPORT, CONNECTICUT
Subsidiary of Atlantic Coast Industries, Inc.
FINE QUALITY ALUMINUM, BRASS AND BRONZE IN STRIP AND ROLLS

THE BUSINESS TREND



	1959	1958	1957	1956
Jan.	115.84	93.07	126.34	122.43
Feb.	124.77	93.49	139.29	129.56
Mar.	146.36	97.89	140.76	166.14
Apr.	147.28	122.36	132.67	145 20
May	164.45	118.04	157.95	155.53
June	170.72	131.15	121.57	189.13
July	130.26	134.34	128.31	165.50
Aug.	.....	104.46	110 09	168.70
Sept.	.....	85.41	116.79	130.35
Oct.	.....	111.35	124.80	143.38
Nov.	.....	110 88	87.80	138.50
Dec.	.....	105.97	105.65	117.76
Avg	.....	109.87	124.34	147.68

Material Handling Institute Inc.



	1959	1958	1957
Jan.	127.4	57.9	117.9
Feb.	237.1	57.6	188.4
Mar.	166.6	85.9	127.0
Apr.	154.2	88.7	101.1
May	157.0	136.1	136.2
June	125.1	87.7	187.5
July	110.7	77.9	98.6
Aug.	....	74.1	231.3
Sept.	....	64.5	113.9
Oct.	....	118.9	145.3
Nov.	....	83.3	59.6
Dec.	....	137.0	61.4
Avg	....	89.1	130.7

Foundry Equipment Mfrs. Assn.
Charts copyright, 1959, STEEL.

about their sales and profits in 1959:

Burroughs Corp., Detroit, expects to mark up sales in excess of $300 million, says Ray R. Eppert, president. The record (set last year) is $294.1 million. Profits should exceed those of the first half, with improvement continuing into 1960. The steel strike hasn't had much effect on sales or profits.

Square D Co., Detroit, is looking for sales in excess of its record $104,100,000 in 1957, with profits close to the $9.1 million (same year). Demand for control systems and electrical distribution equipment is increasing sharply this year, say company officials.

Sales and earnings of Raytheon Co., Waltham, Mass., in the first half were at record levels, and more improvement is expected in the second half. Charles F. Adams, president, says sales will approach $500 million—$100 million over 1958's.

William E. Grace, president of Fruehauf Trailer Co., Detroit, reports sales are running 30 per cent ahead of last year's and feels that the improvement for the year will run a little higher. Third quarter profits will be as good as the second quarter's, which were about $3.7 million. The third quarter, 1958, showed a loss.

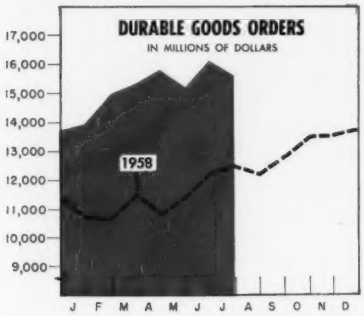
Credit Head Optimistic

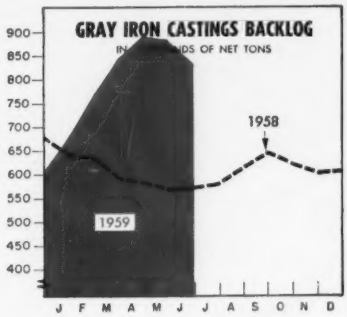
Edwin B. Moran, executive vice president of the National Association of Credit Management, New York, goes along with this view: "We have never had it so good," he declares. "We can, with reasonable confidence, look forward to record prosperity for the balance of 1959 and at least through the first quarter of 1960. Not even higher interest rates are going to halt increased consumer spending and higher industrial production."

He feels that substantial demand for 1960 automobiles, continued strong consumer confidence, and increased industrial spending for plant and equipment will sustain prosperity. He forecasts a 7 to 10 per cent gain in auto accessories and parts this year and says that farm machinery sales will be the largest since 1951.

Buyers See Stability

Sustained confidence is also shown in the latest report of the Purchasing Agents Association of Chicago. Members report that production, employment, and backlogs are stable at high levels. Only profits show any indication of declining.





	New Orders* 1959	New Orders* 1958	Sales* 1959	Sales* 1958
Jan.	13.900	10.704	13.541	12.646
Feb.	14.918	10.688	13.870	12.038
Mar.	15.323	11.488	14.400	11.670
Apr.	15.796	10.833	15.166	11.532
May	15.241	11.423	15.515	11.643
June	16.133	12.245	15.771	12.086
July	15,589†	12 512	15,363†	12,256
Aug.	.....	12.177	.....	12,385
Sept.	.....	12.859	.....	12.723
Oct.	.....	13 530	.....	12.943
Nov.	.....	13.574	.....	13.295
Dec.	.....	13.673	.....	13,613

*Seasonally adjusted. †Preliminary.
U. S. Office of Business Economics.

	Shipments 1959	Shipments 1958	Unfilled Orders* 1959	Unfilled Orders* 1958*
Jan.	1,002	868	687	638
Feb.	1,037	753	767	632
Mar.	1,206	796	847	590
Apr.	1,246	807	892	582
May	1,236	820	885	570
June	1,252	868	837	573
July	....	....	...	580
Aug.	....	....	...	614
Sept.	....	....	...	645
Oct.	....	....	...	620
Nov.	....	....	...	602
Dec.	....	....	...	608
Total	...	10,372		

*For sale. U. S. Bureau of the Census.

Nineteen per cent of respondents indicate lower earnings during August. At the same time, 20 per cent indicate an uptrend, while 61 per cent say profits are the same as they were in July.

What if raw material costs were to go up 5 per cent in the next 60 days? Forty-eight per cent said they would absorb the increase, while 52 per cent declared they would raise their selling prices.

Index Hits Year's Low

STEEL's industrial production index has hit its lowest point of the year, and from now on the direction should be up. During the week ended Sept. 12 (including Labor Day), the trend line fell to 104 per cent of the 1947-49 base period. The decline of a little less than 5 per cent for the holiday period was less than seasonal, largely because of the already depressed conditions in the steel and rail freight industries.

Only a continuation of the steel stoppage into October could cause a further decline in the index. Shortages of materials in the auto and other metal fabricating industries would cut even more into railroad freight carloadings and industrial consumption of electricity.

However, the auto industry probably can weather another two or three weeks of steel strike without cutting its schedules too much. There is the possibility of part shortages, but auto producers are investigating ways of minimizing the effects by turning to conversion deals. All producers are turning out 1960 models. Before the end of the month they should be operating at year-ago levels.

Trends Fore and Aft

• Producers of material handling equipment experienced a drop in July which many felt was overdue. (See graph and table, Page 70.) For the first seven months of the year, they are 26.5 per cent ahead of the similar 1958 period. They had figured 1959 to be only about 12 per cent better than 1958.

• The Department of Commerce estimates that motor vehicle registrations will reach 70,416,000 units by the end of the year, up 3.1 per cent over 1958's figure. This is the largest increase since 1956.

• July was the worst month for new orders in the foundry equipment business since last November (see graph and table, Page 70).

Where strength is a factor

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. . . Induction heated

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This includes assistance in adapting present equipment for handling stainless steel—along with counsel on set-up and operating procedures. It even can include help in tool design for long tool life and economical production and to assure quality of finished parts.

In short, metallurgical service at The House of Stainless can be as broad and inclusive as you want it and the help you get costs you nothing.

With our complete warehouse stocks, we can make prompt deliveries for normal requirements. Where mill shipments are called for, we are in constant touch with the leading stainless producing mills and can fill your needs at no extra cost to you.

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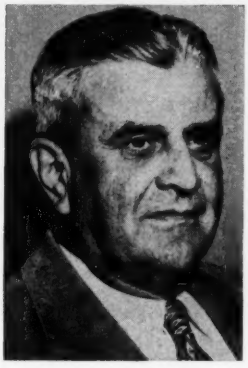
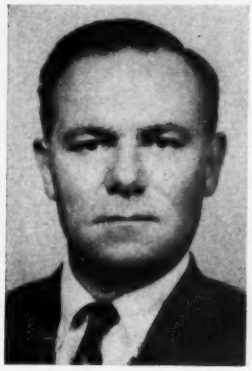
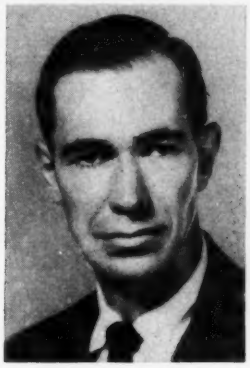


HECTOR P. BONCHER
Dresser Industries marketing



DONALD A. BOOTH
Dravo div. engineering mgr.



CHARLES A. SMITH
Alter Co. vice president

THEODORE F. ESERKALN
Onsrud Machine chief eng.

Hector P. Boncher was made vice president-marketing, **Dresser Industries Inc.**, Dallas. He has been an operating vice president of Dresser Industries since 1955, and previously served as general manager, Dresser Mfg. Div., Bradford, Pa.

Donald A. Booth was made engineering manager, Engineering Works Div., **Dravo Corp.**, Pittsburgh. He was assistant engineering manager for the last year.

Conrad L. Daniels was appointed works manager of the Rockford, Ill., plant of **J. I. Case Co.** He succeeds **Lawrence H. Hodges,** promoted to a top post in central engineering at company headquarters, Racine, Wis.

Barry J. Shillito, former sales head at Hughes Aircraft Co., joined **Houston Fearless Corp.**, Los Angeles, as executive vice president and general manager. In five years with Hughes, he held positions as director of materiel and also as assistant head of administration.

Royden Walters was elected executive vice president of **Saco-Lowell Shops**, Boston. He joined Saco-Lowell a little over a year ago as executive assistant to the president and became a vice president last March. In June, he became responsible, as assistant general manager, of both the Saco-Lowell Textile Machinery Div., Easley, S. C., and the Saco-Lowell Gear & Machine Div., Sanford, N. C., as well as general manager, Saco-Lowell Textile Replacement Parts Div., Greenville, S. C.

Charles A. Smith was elected vice president, **Alter Co.**, Davenport, Iowa. Associated with Alter since 1953, he was most recently serving as buyer. **George Otte** was elected treasurer. He joined the company in 1957 as comptroller.

Carl P. Cronk fills the new post of manager-market research, **Electric Auto-Lite Co.**, Toledo, Ohio. He was manager of product planning and research for the National Electric Div. of H. K. Porter Company Inc.

John J. Kelliher was appointed chief industrial engineer and a member of the management committee of **National Pneumatic Co. Inc.**, and **Holtzer-Cabot Divisions,** Boston.

John R. Strom was made chemist and process engineer, **Roto-Finish Co.**, Kalamazoo, Mich.

J. Tom Maidens was made director of sales for **Beaver Tool & Engineering Corp.**, Gaylord, Mich. He previously served for 12 years as district sales manager for Morse Twist Drill & Machine Co., for two years as divisional sales manager, Eclipse Counterbore Co. **Albert Iacco,** former sales manager, was promoted to vice president-manufacturing.

Boyd S. Oberlink and **J. L. Singleton** were elected senior vice presidents of **Allis-Chalmers Mfg. Co.**, Milwaukee. Both had been vice presidents. **Roy M. Casper,** general manager, Atomic Energy Div., and **L. W. Davis,** general manager, Farm Equipment Div., were elected vice presidents.

Theodore F. Eserkaln was appointed chief engineer, **Onsrud Machine Works Inc.**, Niles, Ill. His duties include responsibility for engineering design and development, engineering specifications, and final test procedures.

Robert L. Williamson was named vice president and general sales manager, **Rome Cable Div.**, Aluminum Co. of America, Rome, N. Y. He was manager of pig and ingot sales for Alcoa since 1955. **Frederick S. Marks Sr.** was appointed vice president and manager of distribution. He is succeeded as treasurer of the division by **Gerard A. Weiss.**

Richard E. Krafve was elected executive vice president, **Raytheon Co.**, Waltham, Mass. He was group vice president - commercial. **Homer R. Oldfield,** vice president and manager, Government Equipment Div., was elected to the new post of group vice president - electronic components and devices. **Shepard M. Arkin** fills the new post of marketing manager, Missile Systems Div.

H. J. Endean was named manager-closure sales for **Aluminum Co. of America**, Pittsburgh. He succeeds **R. W. Dispennett,** now manager of Alcoa's Pittsburgh district sales office.

E. K. Leavenworth was appointed a vice president of **Climax Molybdenum Co. of Michigan.** He continues headquarters at the Coldwater, Mich., plant where he serves as works manager.

Lucifer Furnaces Inc., Neshaminy,

S. DEAN SHOPHER

ROBERT W. STEPHENS

Kaiser Alum. & Chemical plant operations

CURTIS B. HOFFMAN

JOHN H. HARRIS

Clevite electronics operations posts

Pa., appointed **John J. Shingle** chief engineer.

S. Dean Shopher was appointed works manager of the Mexico Refractories plant at Mexico, Mo., of the Chemicals & Refractories Div., **Kaiser Aluminum & Chemical Corp. Robert W. Stephens** was made plant superintendent of the new Midland, Mich., refractory magnesia plant, scheduled for operation about Apr. 1, 1960.

Reed W. Campbell was named chief engineer, **Patterson Foundry & Machine Co.**, East Liverpool, Ohio. He was product manager, reaction vessels and processing systems.

Walter W. Slocum was appointed president, **International Resistance Co.**, Philadelphia. He succeeds **Charles Weyl** who becomes chairman to succeed **Ernest Searing**, retired. Mr. Slocum was formerly with Daystrom Inc. where he headed several divisions at various times, and was also vice president-operations.

Curtis B. Hoffman, general manager, **Brush Instruments Div., Clevite Corp.**, Cleveland, was elected Clevite's vice president-electronics. He succeeds **J. K. Nunan**, resigned. **John H. Harris**, general manager, Texas Div., until its recent sale, was named to succeed Mr. Hoffman at Brush.

Walter R. Bush was named manager of an autonomous electronics department established by **Hamilton Standard Div.** of United Aircraft Corp., Windsor Locks, Conn. Mr. Bush's staff includes **Charles B. Brahm**, promoted to chief development engineer; **Charles F. Myers**, sales manager; **William F. Mulcahy**, factory manager.

Alexander D. Barczak fills the new post of operational vice president of **Superior Foundry Inc.**, Cleveland. He has been plant manager.

Wm. L. Reid was appointed purchasing agent, Pueblo, Colo., Div., **Colorado Fuel & Iron Corp. Lloyd H. Lett** was made assistant purchasing agent for the division. Mr. Reid was administravtive assistant to the director of purchases. Changes take effect Oct. 1.

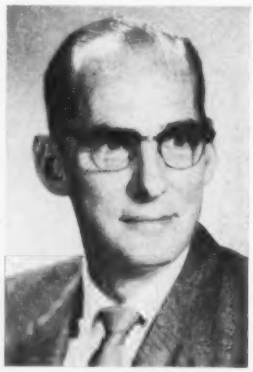
L. C. Simmons was made administrative vice president-accounting, **United States Steel Corp.**, Pittsburgh. In the Accounting Dept., **Joseph R. Dembeck** was named director, long range planning and appropriations; **Robert B. Lehman** director, cost and statistics.

Robert L. Allen was named president, **Solar Chicago Div.**, U. S. Industries Inc., Chicago. He was general sales manager of the division. **Arthur Sternberg**, who has been functioning as president of both the Solar Chicago and Solar Permanent Divisions, will concentrate on the latter.

R. W. Campbell joined **Pittston Clinchfield Coal Sales Corp.**, New York, as a consultant on carbonization and operational problems. He had served Jones & Laughlin Steel

WALTER W. SLOCUM

International Resistance pres.



WM. L. REID

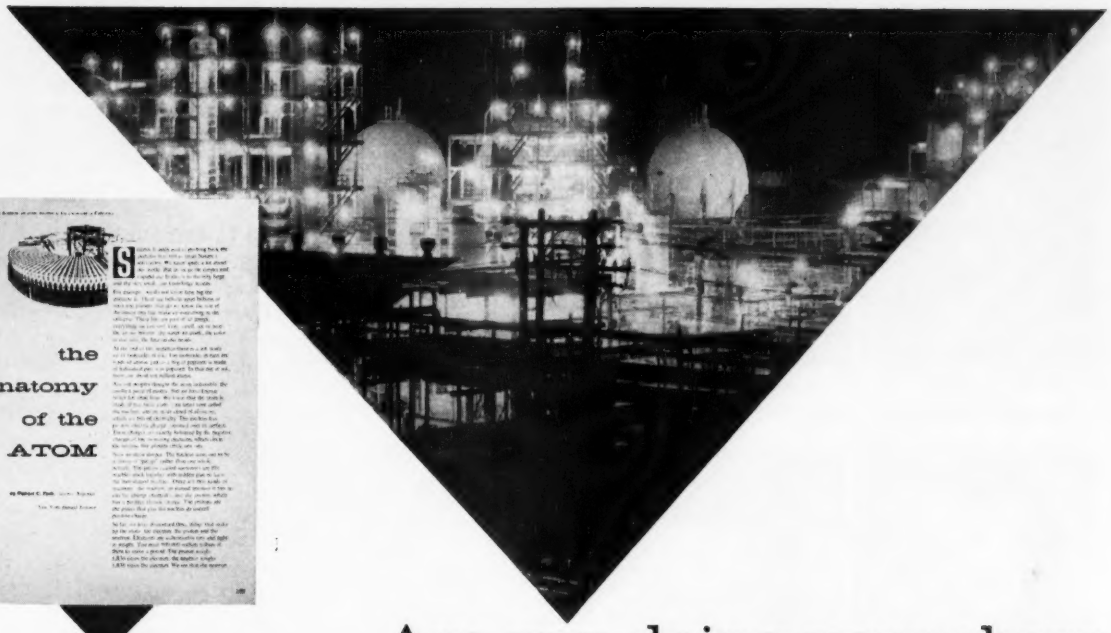
CF&I purchasing agent

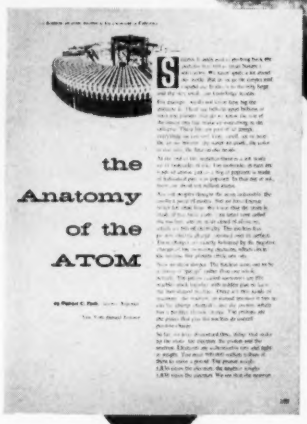
ALEXANDER D. BARCZAK

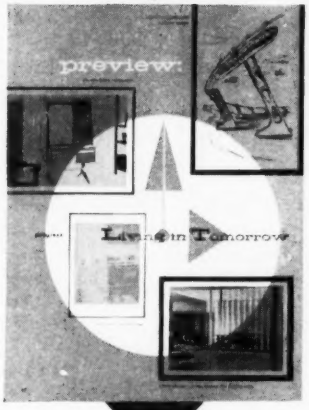
Superior Foundry v. p.

ROBERT L. ALLEN

Solar Chicago president







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T. J. PETERS
Acme Steel appointment

DONALD C. DUNCAN
Pacific Electronic Controls pres.

RICHARD W. FLAGG
Denver Equipment promotion

CHARLES E. ALLING
Bullard marketing mgr.

DONALD H. MITCHELL
joins J. I. Case Co.

DELBERT A. BURMAN
Crucible asst. purchasing dir.

Corp. as co-ordinator of coke plant operations.

Charles E. Alling was promoted to marketing manager of **Bullard Co.**, Bridgeport, Conn. He was sales engineer for the eastern New England sales territory in Boston and is succeeded by **Louis Jacobelli**, former sales representative, Special Products Div.

Donald H. Mitchell joined **J. I. Case Co.**, Racine, Wis., as manager of its new Industrial Products Div. He was eastern sales manager for LeTourneau-Westinghouse Co.

Forest B. Griffin was appointed production manager by **Metal Hydrides Inc.**, Beverly, Mass.

Paul M. Buhrer and **Raymond P. Bergan** were appointed vice presidents of the newly formed **Union Carbide Consumer Products Co.**, a division of Union Carbide Corp., New York.

Karl R. Brunt was made assistant director, Organization Planning Div., **Jones & Laughlin Steel Corp.**

Delbert A. Burman was appointed assistant director of purchases, **Crucible Steel Co. of America**, Pittsburgh. He was formerly buyer in the Purchasing Div.

In the Cleveland district of **Allis-Chalmers Mfg. Co.**, **T. L. Dineen** was made manager, general industrial sales; **Roger W. Cavanaugh** manager, metals industry sales; **W. F. Bueche** manager, utility sales; and **R. M. Morrow** supervisor, original equipment manufacturers and distributor sales.

Edwin A. Yeo Jr. was promoted to the new post of assistant manager in the Sales Div. of **Leeds & Northrup Co.**, Philadelphia. He is succeeded as Chicago district sales manager by **Willard H. Neu. Manley S. Nolen** succeeds Mr. Neu as Pittsburgh district sales manager.

Carl B. Wille, director of engineering, **Carborundum Co.**, Niagara Falls, N. Y., was promoted to general manager, Curtis Machine Div., to succeed **Gene DeMambro**, resigned.

T. J. Peters was appointed director of plant engineering and construction for **Acme Steel Co.**, Chicago. He joined Acme in 1954 as director of construction and maintenance. Previously, he was division superintendent at South Works, U. S. Steel Corp.

Donald C. Duncan, director of contract sales for Beckman Instruments Inc., was named president of **Pacific Electronic Controls Corp.**, Monrovia, Calif., subsidiary of Royal Industries Inc. Pacific Electronic Controls produces a variety of electronic components and holds the original licenses under patents of Beckman Instruments for manufacture of precision potentiometers.

Richard W. Flagg, for the last two years assistant director, Denver Ore Testing Div., **Denver Equipment Co.**, Denver, was promoted to chief metallurgist. He succeeds **H. J. Gisler** who was promoted to manager of the Eastern Sales Div.

James A. Leake was made sales manager, Stamping Div., **Rockwell-Standard Corp.**, Utica, N. Y. He succeeds **E. B. Corrigan**, retired.

John W. Ferguson was made general manager of **Boots Aircraft Nut Corp.'s** West Coast office and warehouse at Pasadena, Calif.

J. Willis Herb was appointed technical director, Strip Steel Div., **Peterson Steels Inc.** He has headquarters at Melrose Park, Ill.

OBITUARIES...

Richard McCoy, 40, welding sales engineer, **Metal & Thermit Corp.**, New York, died recently.

H. Lewis Williams, 72, retired manager of **Bethlehem Steel Co.'s** Pottstown, Pa., Works, died Sept. 3.

Robert Ritchie, 69, chairman of **Jefferson Foundry Co.**, Birmingham, died recently.

Roy E. Hess, 66, retired New York representative for **Transue & Williams Steel Forging Corp.**, died Sept. 2.

Edwin W. Buschman, president, **E. W. Buschman Co.**, Cincinnati, died Sept. 4.

Exacting Requirements?

Morton Manufacturing Company, of Muskegon Heights, Michigan, is a leading manufacturer of heavy duty machinery for the machine tool industry. Boring mills; drillers, planers, as well as special machine tools for national defense and the development of new processes are among their products.

ACIPCO Centrifugally Spun TUBES

SIZE RANGE: Lengths up to 410" have been produced to meet modern machinery requirements. OD'S from 2.25" to 50"; wall thicknesses from .25" to 4".

ANALYSES: All alloy grades in steel and cast iron, including heat and corrosion resistant stainless steel, plain carbon steel and special analyses.

FINISHED: As cast, rough machined, or finished machined, including honing. Complete welding and machine shop facilities for fabrication.

for PRECISION . . . specify

ACIPCO

CENTRIFUGALLY SPUN STEEL TUBES

For almost 80 years, Morton Manufacturing Company of Muskegon Heights, Michigan, has been progressively building bigger and better machine tools.

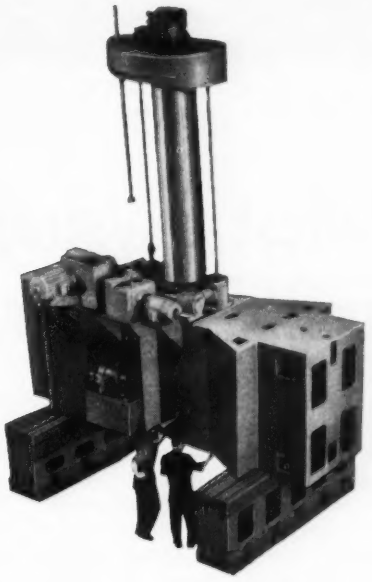
This ultra-modern turning and boring mill is 27 feet x 22 feet x 40 feet high, and weighs 525,000 pounds. Load capacity is 120,000 pounds. Driven with 210 horse-power, it is the first machine of its type wherein the work remains stationary.

Because of the herculean task this machine must perform, each component must be capable of precise performance under extreme loads. Morton wisely selected ACIPCO centrifugally spun steel tubing for the gigantic quill which houses and guides the rotary spindle. This tube is 24" in diameter, 3" in wall thickness and 17'6" long.

ACIPCO centrifugally spun tubes have a dense, non-directional grain structure that has extra-ordinary strength and durability, and is more easily machined to close tolerances.

Whatever you may have in tubular applications, call on ACIPCO for perfect dependability. Our technical and manufacturing competence will serve your exacting needs.

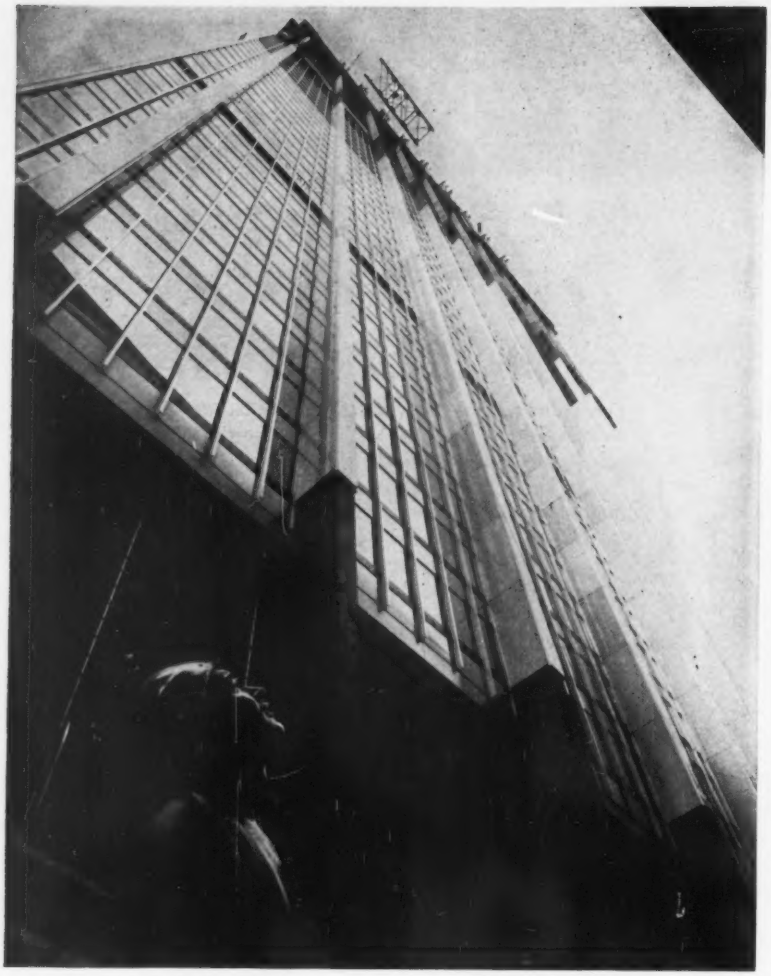
MORTON



SPECIAL PRODUCTS DIVISION

AMERICAN CAST IRON PIPE CO.

BIRMINGHAM 2, ALABAMA



Ironworkers of Bethlehem Steel Co. have completed structural steelwork on the Chase Manhattan Building, New York. The 810 ft structure has 60 stories

Tallest Skyscraper Built In 25 Years Is Topped Out

THE RECENT topping out of the 60 story Chase Manhattan Building, New York, marked the final phase of structural steel erection for the tallest and biggest commercial office structure built in the last 25 years. Only five buildings (all in New York) will exceed the Chase Manhattan's 810 ft height (Empire State, 1472 ft; Chrysler, 1046 ft; Cities Service, 950 ft; 40 Wall St., 900 ft; and RCA, 850 ft).

The building's 53,000 tons of fabricated structural steel are believed to be exceeded only by the RCA Building's 58,500 tons and the Empire State Building's 58,000 tons. In fourth place, with 51,400 tons, is Chicago's Merchandise Mart. Over-all steel usage, plain as well as fabricated, will bulk around 58,000 tons.

• **Ready Next Fall** — Started in January, 1957, the structure will be ready for occupancy by September, 1960. Its gross floor area is 2.3 million sq ft. Exterior dimensions are 107 ft 6 in. by 281 ft 6 in. Cost: $131 million.

The building has no setbacks from the fifth basement level to the top, a total height of over 900 ft. It's claimed that there is no other office building without setbacks of such great height.

The 40 columns supporting the main core are among the heaviest ever fabricated. They were shipped from the Pottstown, Pa., Works of Bethlehem Steel Co. to New York in sections up to 36 ft long and weighing as much as 52 tons. Field connections were made of 500,000 high strength bolts (7/8 to 1 1/4 in.). No rivets were used.

Gary Works Adds Pass Mill

Mesta Machine Co., Pittsburgh, is building a 48 in., two stand, temper pass mill and auxiliary equipment for the Gary (Ind.) Sheet & Tin Mills, U. S. Steel Corp. The mill is designed to skin pass cold reduced, annealed tin plate up to 42 in. wide at a maximum speed of 6000 fpm.

Washington Firm Renamed

Seattle-Puget Sound Bridge & Dry Dock Co., is the new name of Puget Sound Bridge & Dredging Co., recently purchased by Lockheed Aircraft Corp.

Firm Renames Division

Presstite - Keystone Engineering Products Co. is now known as the Presstite Div. of American-Marietta Co., Chicago. The division makes industrial sealing compounds at its main plant in St. Louis and in branch plants at Jackson, Mich.; El Segundo, Calif.; and Chicago Heights, Ill.

Austin Renames Division

Austin Electronics, New York, a division of Austin Co., is the new name for the company's Special Devices Div.

Convair Wins X-Ray Bid

Wright Air Development Center, Dayton, Ohio, awarded a $61,000 contract to the Convair (San Diego) Div., General Dynamics Corp., for the development of x-ray standards for determining the strength of steel castings. Standardized x-ray pictures developed under the program will

be made available to industry as uniform tools in measuring the strength of cast steel without the need for physical testing. Convair is using similar standards for aluminum and magnesium castings.

Square D to Move Offices

Square D Co., international manufacturer of electrical control products and distribution equipment, will establish its executive offices in the Chicago area by next summer.

Ground will be broken next month for a 43,000 sq ft building in Park Ridge, Ill. The company's headquarters have been in Detroit since 1903.

A 56,000 sq ft assembly plant and sales office for the firm's West Central and Midwestern regions will soon open in Schiller Park, Ill.

Bucyrus-Erie Shuts Plant

Bucyrus-Erie Co., South Milwaukee, Wis., will end manufacturing operations at its new drill plant, Richmond, Ind. About 500 of the plant's employees will be affected. The move is attributed to the slow recovery of the drill business from last year's recession.

Engineering, sales, and service operations will remain in Richmond while drillmaking and other departments are gradually consolidated with the firm's other facilities at Evansville, Ind., Erie, Pa., and South Milwaukee. The company is seeking new products for the $12 million Richmond plant, opened last year.

Detroit Operation Moves

Buffalo-Eclipse Corp., Buffalo, is transferring operations of its Detroit division, Penberthy Mfg. Co., to recently expanded facilities in Prophetsville, Ill. Certain machining, manufacturing, and assembly operations for the firm's Eclipse Lawn Mower Co. and Penberthy Mfg. Co. will be consolidated under the name of Prophetstown Mfg. Div.

Coast Facility Planned

Ralston Steel Corp., Chicago, will build a branch in Westwood, Calif. The four story, 40,000 sq ft building will house offices for the firm's expanded West Coast operations, including an import division. It is scheduled for completion within six months.

ASSOCIATIONS

Dr. J. L. Gillson, E. I. du Pont de Nemours & Co. Inc., Wilmington, Del., has been elected president for 1960 of the **American Institute of Mining, Metallurgical & Petroleum Engineers Inc.**, New York. Named president for 1961: R. E. McNaughton, Metallurgical Div., Consolidated Mining & Smelting Co. of Canada Ltd., Montreal, Que.

NEW OFFICES

Precision Extrusions Inc., Bensenville, Ill., established a branch office at 6216 Carrollton Ave., Indianapolis, Ind. The firm produces extruded aluminum.

National Lead Co., New York, has moved the Metal Div. of its Atlantic Branch to the firm's Perth Amboy, N. J., plant at 1050 State St.

Heald Machine Co., Worcester, Mass., has opened a new branch office at 2900 Erie Blvd. East, Syracuse, N. Y. Frederick J. Underwood is manager.

NEW PLANTS

Sprague Electric Co., North Adams, Mass., plans to construct a $1.6 million laboratory and office building in North Adams.

Fluor Corp. Ltd., Los Angeles, completed construction of a $10 million helium recovery plant near Boise City, Okla. It was designed for the U. S. Bureau of Mines to extract helium from more than 50 million cu ft of natural gas a day.

Eversharp, Inc., New York, manufacturer of Schick razors, has purchased 40 acres in Milford, Conn., for a new $2 million home office and factory building to replace its present facilities at Bridgeport, Conn.

Ka-Mo Tools Dept. of **Kwik-Mix Co.**, a division of Koehring Co., will move its sales, engineering, and manufacturing operations from Cicero, Ill., to Port Washington, Wis. The department makes earth boring and drilling equipment.

A manufacturing and assembly plant will be erected in West Memphis, Ark., for the **Bellows Co.**, **Valvair Corp.**, and **Sinclair-Collins Valve Co.**, all of Akron, Ohio. They comprise the fluid power divisions of **International Basic Economy Corp.** and are engaged in the manufacture of pneumatic, hydraulic, and electrical components for industrial applications in automating metalworking, textile, plastic, and other manufacturing processes.

CONSOLIDATIONS

Consolidated Systems Corp., a subsidiary of Consolidated Electrodynamics Corp., Pasadena, Calif., leased a 900 sq ft building at 440 W. Foothill Blvd., Monrovia, Calif., for its western regional office. William H. Schetter is manager of the new office.

Inland Steel Products Co., Milwaukee, has purchased the physical assets of **T-Steel Corp.**, Kirkland, Wash.

Speer Carbon Co., St. Marys, Pa., has purchased the **Electronics Div., Onondaga Pottery Co.**, Syracuse, N. Y. The division is now called Onondaga Electronics Div., Speer Carbon Co. and will continue to operate at its present location with no change in personnel. It manufactures ceramic printed circuit packages of resistors and capacitators printed on ceramic plates.

Sharples Corp., Philadelphia, centrifugal and process engineers, has acquired **Centrifugal Div., Fletcher Works Inc.**, also of Philadelphia.

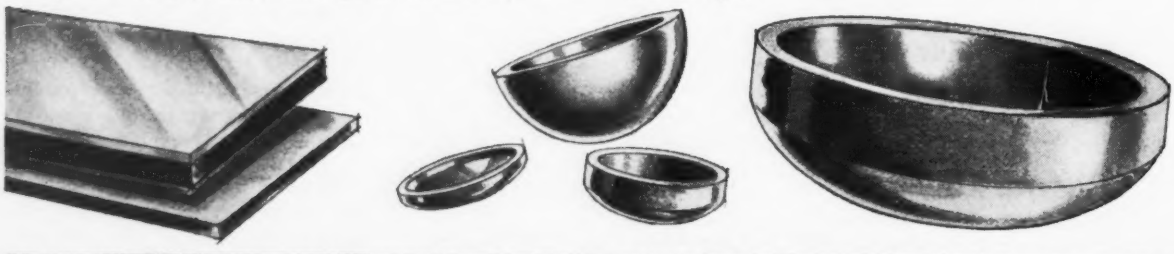
Remember CLAYMONT

TO fabricators and equipment manufacturers, the Image of CF&I means single-source service for many of their steel plate requirements. This giant steelman reflects the integrated steel production and plate fabricating facilities of CF&I's Claymont, Delaware plant.

Claymont makes its own steel, rolls its own plate and performs every plate-fabricating operation, exercising step-by-step quality controls within the Claymont plant. Consequently, steel plate availability is no problem, and customer specifications are met exactly.

Small or large-quantity orders are handled with equal facility. Quick shipments from stocks are available on many items, and delivery promises are kept on special-to-order production.

Whether you need an added source or want a single source for steel plates and steel plate products, contact Claymont. Full details and prompt service are available through any CF&I sales office—and there's one near you.



for steel plates... heads... fabricated plate products

Claymont Steel Plates

CARBON—to all standard ASTM and AISI specifications.

ALLOY—including nickel-bearing ASTM specifications A-203 and A-353 for liquid oxygen storage and other low temperature applications . . . "chrome-moly" ASTM specification A-387 (all grades) for high temperature and high pressure applications . . . as well as ASTM specifications A-202, A-204, A-225, A-302 and AISI specifications 4140 and 4130.

STAINLESS-CLAD—provides the same protection against corrosion, abrasion and contamination as solid stainless—*plus* the economy of carbon steel backing plates. Cladding and backing are inseparably bonded together. Claddings are available in thicknesses from 5% to 50% of total plate gage. AISI stainless specifications 304, 304L, 316, 316L, 316Cb, 321, 347, 405, 410, 430 are provided. ASTM A-263 and A-264 specifications can be supplied also.

CLAY-LOY high strength low alloy steel plates—comply with ASTM specification A-242. Ideal for structural and equipment applications where weight-saving is important.

CF&I LECTRO-CLAD nickel plated steel plates—give positive protection against product contamination and discoloration, at less cost than solid nickel.

Claymont Spun and Pressed Heads

Claymont has complete facilities to produce spun or pressed heads . . . in diameters from 9 inches to 19 feet . . . in gages from 3/16" to 6" . . . in the following shapes: standard or ASME flanged and dished, conical, hemispherical, elliptical, flanged and reverse dished, dished only, flared and dished, flanged and shallow dished, flanged only, and large segmented and welded shapes. Metals include carbon, alloy, stainless or stainless-clad steels; aluminum, aluminum alloy, brass, bronze, copper, Hastelloy, inconel, monel, and other ferrous and non-ferrous metals supplied by our customers.

Large stocks of the more popular sizes of Claymont Heads, flanged and dished in carbon steels, are maintained at the following CF&I warehouses:

Chicago • Claymont, Delaware • Houston • Los Angeles San Leandro, California • Tulsa

Claymont also manufactures a complete line of fittings for pressure vessels, such as manhole and handhole fittings, elliptical manhole rings and storage tank manhole frames and covers.

Claymont Fabricated Steel Plate Products

Claymont's production-line fabrications shop is completely equipped to convert the steel plate of your choice into completely-fabricated assemblies or simple, single-operation parts or components. Job-shop facilities of all kinds are available to furnish welded, rolled, sheared, flame-cut, pressed, punched or machined products to exacting specifications. Claymont's fabricated structural weldments range from 120-ton fully-welded sections to such items as bearing assemblies, base and tie plates, wedges, gussets and straps.

Use Claymont's complete plate fabrications facilities as an extension of your own shop. Have difficult, time-consuming operations performed *before* the steel plate is delivered, and save shipping and handling on the part of the plate that you can't use.

If you use any of the steel plate products listed above, or large diameter API Pipe, contact the nearest CF&I sales office.

Claymont Steel Products

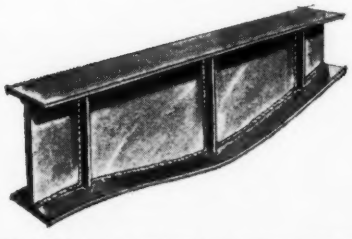
THE COLORADO FUEL AND IRON CORPORATION

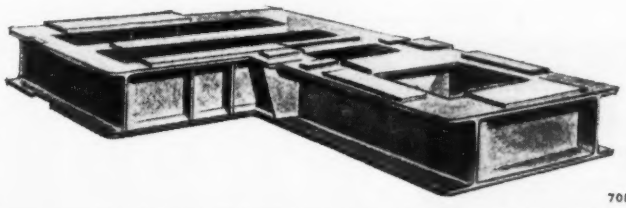
CF&I STEEL

In the West: **THE COLORADO FUEL AND IRON CORPORATION**—Albuquerque • Amarillo • Billings • Boise • Butte • Denver • El Paso Farmington (N. M.) • Ft. Worth • Houston • Kansas City • Lincoln • Los Angeles • Oakland • Odessa • Oklahoma City • Phoenix Portland (Ore.) • Pueblo • Salt Lake City • San Francisco • San Leandro • Seattle • Spokane • Tulsa • Wichita

In the East: **WICKWIRE SPENCER STEEL DIVISION**—Atlanta • Boston • Buffalo • Chicago • Detroit • New Orleans • New York • Philadelphia

CF&I OFFICE IN CANADA: Montreal • **CANADIAN REPRESENTATIVES AT:** Calgary • Edmonton • Vancouver • Winnipeg





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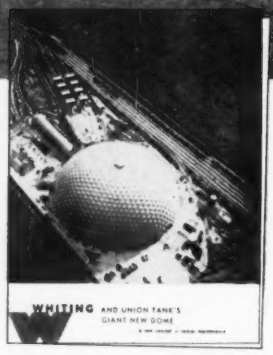
Many railcars move quickly and efficiently in and out of one of the world's most modern railcar repair shops. A single Trackmobile handles them all at the Union Tank Car Company's giant dome-shaped plant near Baton Rouge, La. Trackmobile pulls them inside the shop and teams up with a Whiting Radial Transfer Table to keep all maintenance stations busy. A most versatile machine, Trackmobile transfers easily from rail to road. Plants throughout the country use it to haul, switch, and spot.



FOR MORE INFORMATION on Trackmobile at Union Tank Car Company write for Bulletin 245. *Whiting Corporation,* 15643 *Lathrop Avenue, Harvey, Illinois.*

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MANUFACTURERS OF CRANES; TRAMBEAM HANDLING SYSTEMS; TRACKMOBILES; FOUNDRY, RAILROAD, AND SWENSON CHEMICAL EQUIPMENT.

NEW ZINC ALLOY—With the automotive industry as a prime target, researchers at Hydrometals Inc., Chicago, have come up with a new alloy that's a blend of titanium (0.1 to 0.4 per cent), copper (0.5 to 1.25 per cent), and zinc. The material is said to have the basic advantages of zinc with strength approaching that of mild steel. The material can be heat treated. It also can be rolled into sheets or extruded. Welding and brazing are no problems, and the developers claim the metal is easier to plate than conventional zinc alloys. Cost: Less than copper and slightly higher than aluminum.

MORE ON DIRECT REDUCTION— A continuous, fluidized method of reducing high grade ore, called the Nu-Iron process, may be a good way of supplementing blast furnace output, asserts U. S. Steel Corp., Pittsburgh. It uses two beds and is similar to the H-Iron process developed by Bethlehem Steel Co., Bethlehem, Pa., but uses higher temperatures and lower pressures.

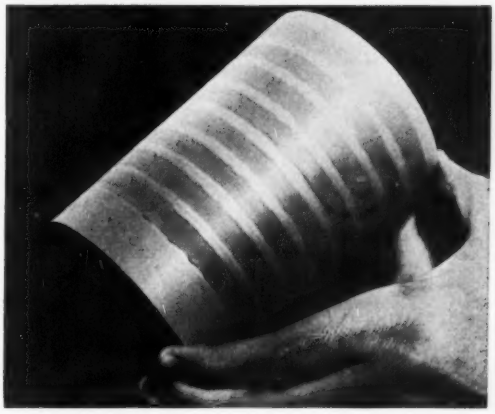
BLOWING UP A GALE— Use of air velocities up to 200 miles per hour in heat treating equipment permits heating work as fast as the metal can absorb the energy. The high horsepower forced circulation furnaces, which cut floor space for heat treatment, will be exhibited at the National Metals Exposition at Chicago, says Surface Combustion Corp., Toledo, Ohio.

MORE HEAT FOR REACTORS—Unless the trend changes, future atomic reactors may operate at such high temperatures that ceramics rather than metals will be required for construction. The possibility is causing some concern among metal producers, who are spurring research efforts to find more high temperature alloys.

HARNESSED LIGHTNING— Electrical explosions may be added to the list of new metal forming processes. A so-called spark bomb has been used on some forming jobs (experimentally) that are normally done by hydraulic presses. Adolph Kastelowitz, director of manufacturing research, Republic Aviation Corp., Farmingdale, N. Y., explains that electric power is fed to a battery of capacitors. Wires connect the capacitors to two electrodes immersed in water. When the discharge is released, the spark creates a shock wave that does the forming. The goal: A spark forming machine tool costing about $50,000.

SOLAR FURNACE KIT—Do-it-yourself has reached high temperature research circles. A new kit (cost: under $3000) enables experimenters to build their own high temperature solar furnace. Made by Waltham Precision Instrument Co., Waltham, Mass., it comes with an automatic tracking device which locks into sunbeams without prompting.

PROPERTIES OF AM 350 DEFINED—The Air Force has determined the kind of treatment needed to obtain desired properties in AM 350 and AM 355 stainless steels. Subzero treatment without high temperature aging gives maximum strength; the minus 100 to plus 950°F treatment gives the best ductility. (For a report, order PB151706 from OTS, Department of Commerce, Washington 25, D.C. Price $1.50.)



WELDED STRIPES on this aluminum piston are four times as hard at 500° F as commercial auto pistons, and twice as hard at room temperature, claims Aluminum Co. of America Research Laboratories, Cleveland. Four new aluminum welding alloys are being tested to upgrade the wear resistance of aluminum castings and forgings, the firm reveals

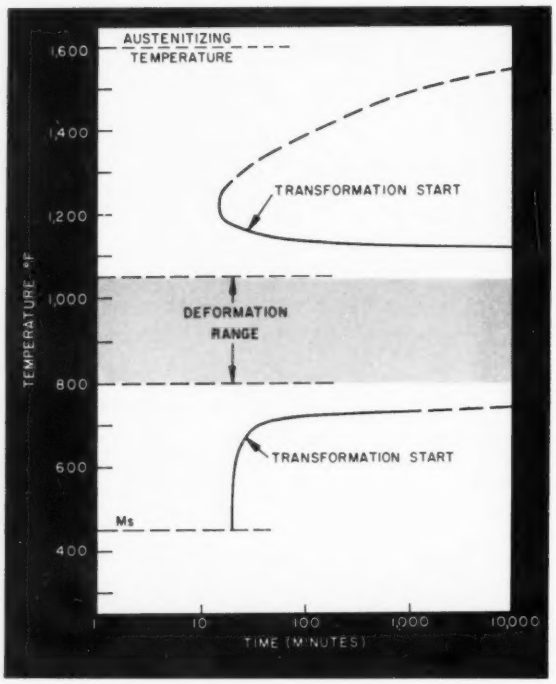
500,000 psi Steel . . .

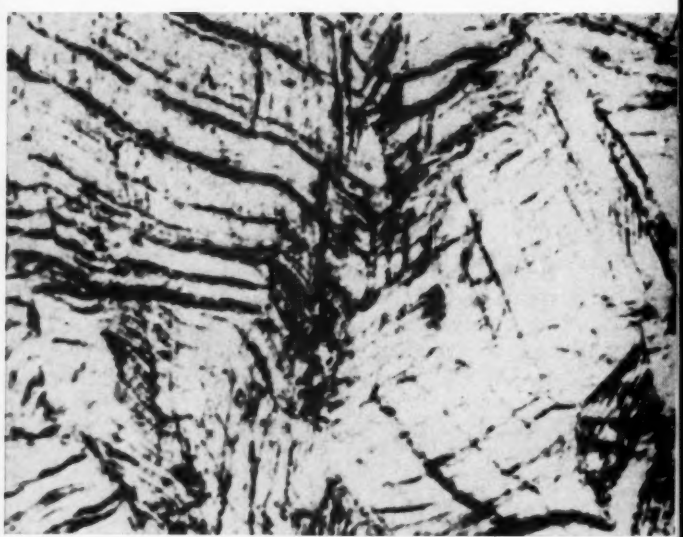
X15,000

Electron photomicrographs point up the remarkable improvement Ford achieves in refining martensite. Platelets in standard sample (above) are about 3 microns long; Ausformed examples are less than 1.5

X15,000

Modification of SAE 4340 creates typical bay in which deformation range is located. Bainite, and subsequently martensite, doesn't begin to form until heavy working is completed





Ford Leaps the Tensile Barrier

New process promises early availability of fantastically strong shapes and parts. It's the latest answer to the threat of lightweight metals to steel's supremacy, declares developer

SCIENTISTS at Ford Motor Co., Dearborn, Mich., have found a new way to push an alloy steel into the 400,000 to 500,000 psi range of ultimate tensile strengths and still retain good ductility.

The steel: A modified SAE 4340 (it's described as a high hardenable steel with a metastable austenitic bay).

The method: Extremely heavy mechanical working in the 800 to 1050° F range followed by transforming to martensite and tempering.

Ford has established a trademark (Ausform) for the process. "Our idea is to heat treat and form all at once. You need the large reduction of cross-sectional area to get such extraordinary results," says E. D. Marande, manager of the metallurgy department, scientific laboratory.

• The success sheds a brilliant light on the real significance of fine martensite.

For a long time many metallurgists believed 350,000 psi was the ultimate practical strength for alloys. Steelmen have known that you need a fine grained austenite to get good properties, particularly toughness. They concentrated on the austenite, at the same time acknowledging that martensite fineness also seemed important.

This development means that metallurgists can bear down on getting finer structures at the transformation temperatures of various alloys. Perhaps they will find ways to make the technique pay off with other steels.

Mr. Marande describes the process this way: "We start by modifying an SAE 4340 steel, so we have more time to mechanically work the steel before austenite turns to bainite. We work the daylights out of the steel (a minimum of 93 per cent reduction of cross section) in the 800 to 1050° F temperature range. Naturally, that temperature is difficult to control. During severe reduction passes, it tends to shoot up rapidly, so we have to watch it carefully. Holding furnaces can be used to keep temperatures well within that range.

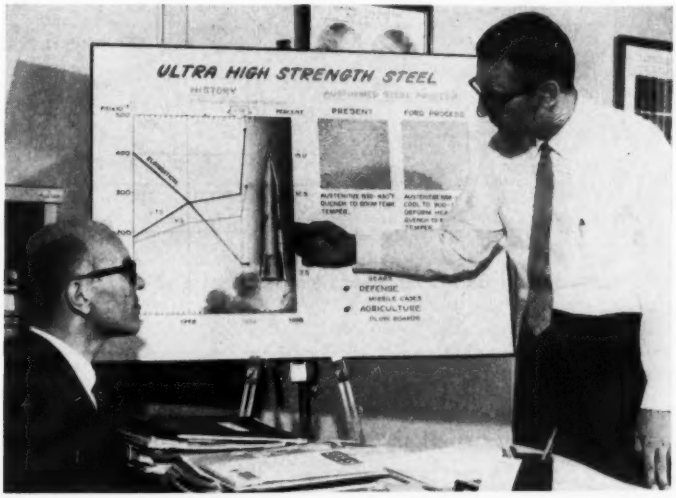
"After deformation, we quench the parts in oil and follow with a tempering."

• Dr. Victor F. Zackay, supervisor of physical metallurgy, explains why the alloy responds to Ausforming:

"We tried a number of alloy compositions before we were able to pick the right area. Chrome additions open the bay (on the transformation diagram) and permit wider temperature variations in the deformation process. Essentially the rest of the composition is similar to proprietary ultrahigh strength steels.

"The high silicon content is re-

Ford method heavily deforms slip bands in the austenite. Dark bands are nonmartensitic products which represent boundaries of slip bands. Note the block arrangements within bands

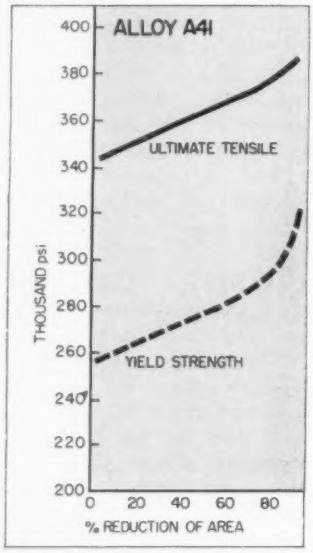


Dr. Victor F. Zackay (right) and Edward D. Marande discuss the development of Ford Motor Co.'s ductile high strength steel

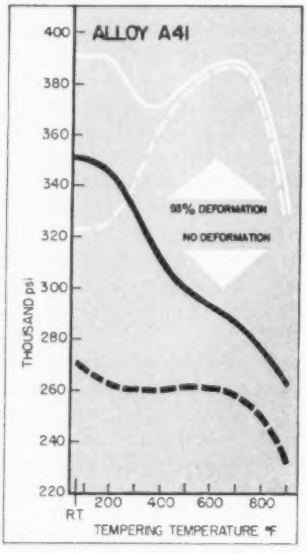
Ford Worked with These Steels

Alloy	C	Cr	Ni	Mn	Si	Mo	V
A31	0.31	2.21	1.03	1.15	1.59	0.31	0.31
A41	0.41	2.23	1.07	1.17	1.64	0.34	0.32
A47	0.47	2.27	1.05	1.10	1.46	0.34	0.32
V48	0.48	2.94	1.65	0.75	1.53	0.42	—
V63	0.63	2.91	1.57	0.75	1.54	0.43	—

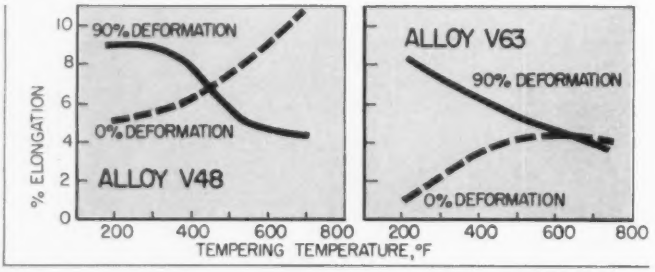
Note: "A" alloys are air melted; "V," vacuum.



Effect of austenitic deformation on ultimate and yield strength is demonstrated



Austenitic deformation reverses normal tempering effects on ultimate and yield strength



Percentage of elongation is upside down, too, because of Ausforming effects

tained in Ausformed steels to improve tempering characteristics in the 500° F range.

"A surprising facet is ductility at low tempering temperatures. In fact, ductility and strength are highest with little or no tempering—both decrease as tempering temperature increases. Results so far also bear out the superiority of martensite to any bainite or pearlite microstructures."

It appears that hot coldworking the austenite is the main reason for the exceptionally small grain size of the martensite in the Ford samples. (It's about half that of untreated samples.) The mechanical working breaks up the austenite into smaller grains, introduces microstresses, and bends the crystal structure.

Here are five reasons why the resulting martensite is finer: Deformation increases grain boundaries and the number of places martensite platelets can form; the microstresses introduced promote the formation of more (and thus smaller) martensite platelets; the bending of the austenitic lattice limits growth of the platelets—so does heavy deformation of the austenitic slip bands. Finally, the austenitic grains are stretched out, which further reduces cross section, blocking growth of the martensite.

The Ford system includes a tempering to obtain a greatly improved yield strength. In some instances, yield and ultimate tensile are identical and exceptionally high (well over 400,000 psi).

Dr. Zackay also points out that rather drastic modifications of the laboratory rolling mills were needed to withstand the enormous pressures of cold rolling steel. Bearings were a great problem and continue to be a limiting factor.

• Summing Up: Dr. Zakay makes the point that researchers are often too conservative, that they ought to raise their sights considerably.

"Steel metallurgists have done a good job with strong, tough alloys which perform well under demanding conditions. But we ought not to be content with what we have done. Titanium producers, for example, in the span of a decade have learned to make alloys equal to steel's 350,000 psi limit on a strength-weight basis," he observes.

On a laboratory scale, the Ausform process has opened the way to high steel tensiles. The concept should be applicable with some modification to conventional steel fabricating equipment, especially where the extra cost is defrayed by the greatly improved properties.

• An extra copy of this article is available until supply is exhausted. Write Editorial Service, STEEL, Penton Bldg., Cleveland 13, Ohio.

Right Methods Aid Forming Of Precoated Steel Tubing

Contrary to some reports, aluminized or zinc coated tubes aren't brittle when handled properly, says major producer. It outlines some rules you can try for better results

FORMING aluminized or zinc coated steels isn't particularly difficult if you follow a few simple principles spelled out by Armco Steel Corp., Middletown, Ohio, to prevent coating damage. (Metals are coated to resist heat and atmospheric attack, so they must remain intact.)

Heavy lubrication, tight clamping or holding pressures, and positioning of the weld are good fabricating techniques, says W. E. McFee, Armco's supervisor-product information.

• Armco has three fairly common grades of metal coated steel tubing.

Aluminized Type 1 can be moderately formed and drawn. It has good bond in both compression and tension. The weld area has been planed and sprayed with molten aluminum to insure complete protection.

Aluminized Type 2 can also be moderately formed, but the operations should be limited to those performed in the mill. Such stock can be bent over a radius as small as three times the tubing diameter.

Zincgrip is a hot dipped material which can take a wide variety of forming. It has the maximum latitude and will take any bend the steel base will tolerate.

For extreme forming, the weld should be positioned at the point of least stress.

• Practically as many operations can be performed on coated as on uncoated tubing.

Cutting, punching, notching, and drilling can be done with hacksaw, lathe, cutoff wheel, saw, shear, or disc.

Bending rules are essentially unchanged from those required for uncoated stock.

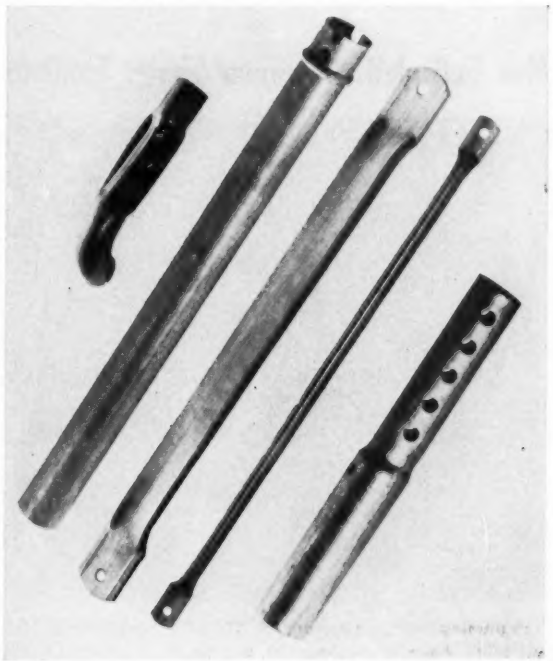
Reducing, expanding, bending, and flattening are the most severe operations you can perform with tubing. Whether done on swagers, presses, or rotating dies, your best bet is probably Zincgrip, says Mr. McFee.

Mechanical joints are ideal for coated tubing because you don't destroy the continuity of zinc or aluminum. Proper techniques make it possible to weld or braze coated stock. Spotwelding and studwelding don't destroy the coating adjacent to the weld, an advantage over gas and arc, which do.

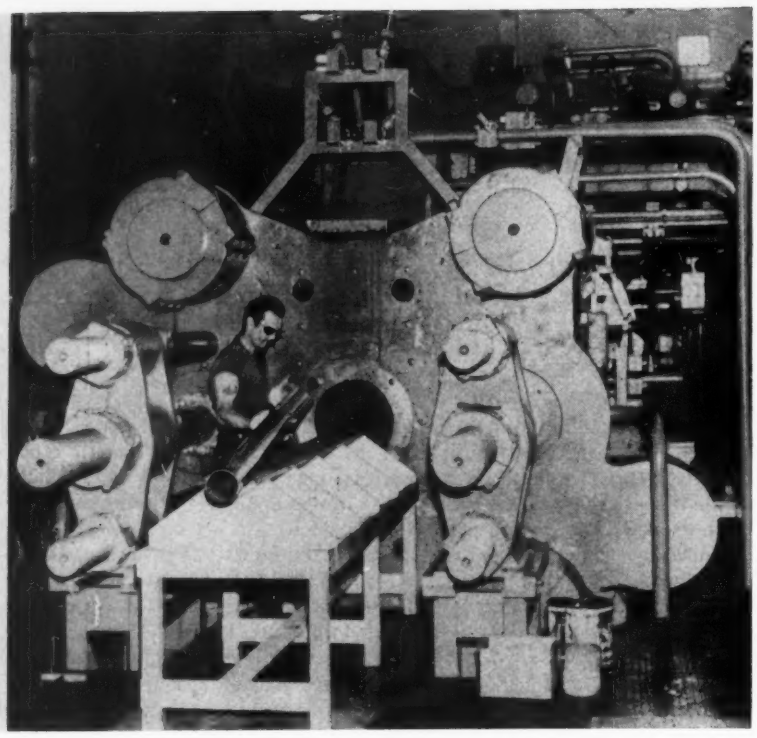
Four methods are in common use to restore damaged coatings: Metallizing; painting with zinc or aluminum bearing paints; dusting with zinc powder or paste followed by melting for fusing; and tinning.

How you clean or finish such products depends on end use. In most cases, it won't be necessary.

These examples show the extent to which fabricators form, reduce, bead, and flatten precoated tubing successfully. Bent examples are aluminized; the others are zinc coated



Bridgeport Brass processes many metals below the recrystallization temperature. Dimensions can be held closely. Hydraulic presses exert steady pressure

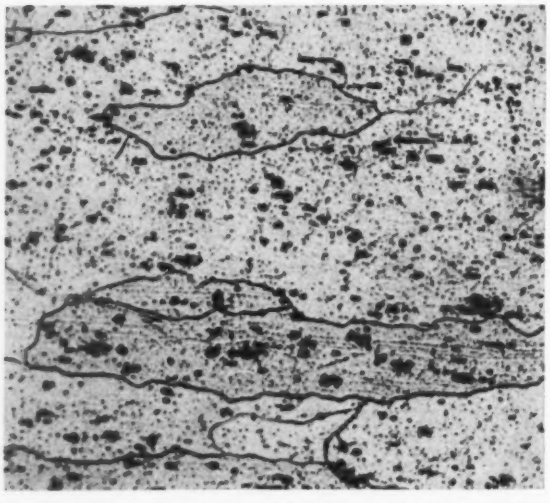


Extruding Costly Metals Cuts Scrap, Ups Physicals

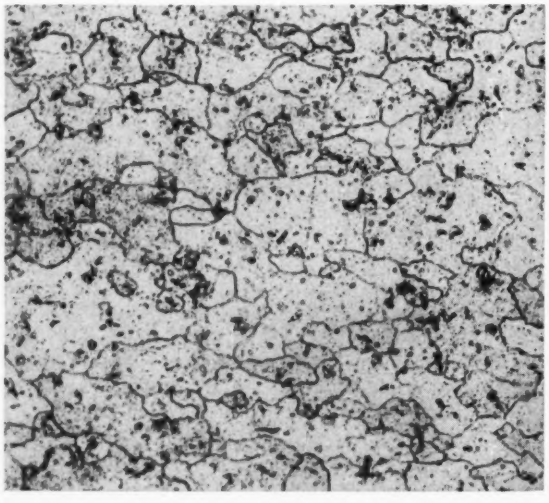
WHEN YOU'RE WORKING an expensive metal, elimination of waste becomes more than desirable —it's essential. Chips are valuable but costly to reprocess.

Bridgeport Brass Co. found that extrusion at low temperatures (below the recrystallization point but

Hot Extruded Aluminum Shows Elongated Grains



Longitudinal grain structure of 2014-T6 aluminum (X100, modified Keller's etch for 30 seconds)



Transverse grain structure of same specimen. Note size and directional orientation (same etch and magnification)

usually above room temperature) is one way to reduce this loss. With zirconium, for example, R. A. Quadt, Bridgeport's research and development vice president, reports recovery from billet to final shape as high as 85 per cent.

• **That's Not All**—This type forming is "cold" working, so final physicals are improved; sections can be reduced for further savings. Temperatures are low enough so that protective coatings (to prevent reaction with air during handling) aren't required. Dimensions can be held closely, and wall finish and concentricity are good, reducing final machining. Uneven sections are no problem, says Mr. Quadt.

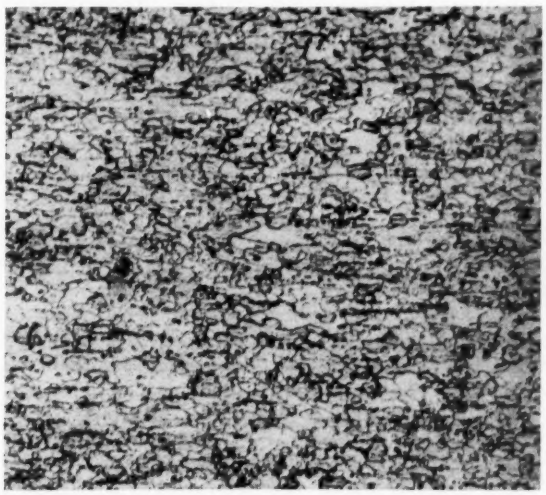
• **Hydraulic Presses** — Bridgeport's process differs from the impact extrusion method long used to form aluminum and other soft metals into collapsible tubes and similar products; special hydraulic units, instead of fast acting mechanical presses, are used. The action is a squeeze rather than a blow. Presses range from 200 to 3500 tons in capacity, and maximum ram deviation from the punch axis is 0.002 in. on power strokes up to 108 in. Design is heavy for maximum rigidity, permitting wall thickness deviations of as little as 0.001 in.

Ram speeds are not high and can be controlled at any rate up

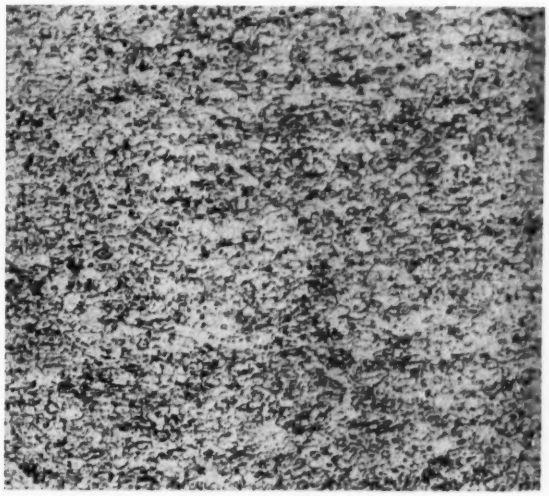
Cold Extrusion Modifies Physicals

	Tensile strength psi	Yield strength psi	Elongation %
Titanium (99.0%)			
Annealed Minimum as specified	80,000	70,000	15
As extruded reduced 82%	130,000	115,000	12.5
Extrusion annealed and air quenched	105,600	79,000	17
Titanium (99.2%)			
Annealed Minimum as specified	65,000	55,000	20
As extruded reduced 82%	112,500	95,000	12
Extrusion annealed and air quenched	91,500	69,900	17.5
Zirconium			
Annealed	35,900	15,900	31
As extruded Reduced 80%	73,000	61,000	16
Columbium			
Annealed bar	39,400	24,200	49
As extruded	64,400	62,200	9
Tantalum			
Annealed bar	65,000	55,000	30
As extruded	100,300	86,400	12
Molybdenum			
Annealed Bar	75,000	50,000	40
As extruded reduced 75%	130,000	120,000	5

Cold Extruded Aluminum Grains Are Equiaxed



Longitudinal structure of cold worked specimen (X100, modified Keller's etch for 30 seconds)



Transverse microstructure of preceding specimen (same etch, magnification). Little dimensional variation with direction

to 180 in. per minute. This is similar to the methods used in hot extrusion.

• **Lubrication Is a Problem** — Each material requires a separate study of available lubricants. Tests must be correlated with the temperature used and the rate of extrusion to determine optimum conditions and procedures. Lubrication information, the essential knowhow of the cold extrusion shop, is considered a trade secret.

Workers in the field state that it has not been possible to reduce known facts to a scientific basis; empirical tests are time consuming and expensive, but necessary. They hope a theory of lubrication may be developed which will permit prediction of the best lubricants for specific conditions.

• **Aluminum**—Heat treatable aluminum alloys containing copper, magnesium, and silicon were used in the original development work; higher strength alloys containing zinc were tried later. Cold extrusion of these high strength alloys gives a fine, equiaxed grain structure. The supplier can guarantee the same properties in the transverse direction as in the longitudinal. This may not be important in simple tubes or containers, but it's essential for pressure vessels or rocket motor tubes.

Surface finish as extruded runs 30 to 100 microinches, with 70 being typical. Irregular wall designs, including longitudinal ribs or stiffeners, pose no major problems.

• **Zirconium**—Nuclear reactors require this metal for moderator sections, cladding of the fuel elements, pressure vessels, and tubing. Pure zirconium (reactor grade), commercial (contains hafnium), and Zircaloy (tin added to reactor grade material) have been extruded in quantity. Typical reductions are in the range of 80 per cent in solid and hollow shapes.

• **Columbium and Tantalum**—Developments in nuclear powerplants have called for quantities of thin walled tubing. Drawing from a tube blank is practical, but the preparation of the blank can be wasteful. Extrusion cuts waste, produces blanks with good surface and fine grain. Starting material cast from the electron beam furnace has a coarse grain; a suitable surface requires grain refinement.

• **Vanadium**—Also used in nuclear reactors, pure vanadium has been manufactured by extrusion in the form of thin walled tubes. Forged or cast slugs were the starting material.

• **Beryllium**—Here extrusion started with a sintered powder compact. Mr. Quadt reports precision tubes with a good surface were formed without major problems. Cold working reduces voids, and mechanical properties are excellent.

• **Molybdenum** — Sintered slugs from powder, as well as arc cast metal, have been extruded at about 800° F. Newer alloys load tools excessively and can't be handled. Minimum wall thickness is about $\frac{1}{8}$ in.; diameters range 1 to 5 in.; and lengths can be several feet.

• **Titanium** — Like molybdenum, the unalloyed metal has been extruded for tube blanks, but alloys cause excessive loading of the tools, Bridgeport states. As with other forms of the metal, purity of the titanium affects physical properties of extruded sections.

Extruded tubes are further drawn; a typical finished tube is 20 ft long, $\frac{1}{2}$ in. in diameter, with 0.025 in. wall.

• **Steel**—The equipment has been used for stainless and alloy steel tube blanks and missile motor components. The press forms hollow extrusions with the desired wall configuration, even when the design calls for nonuniform wall thickness.

• **Not Universal**—Mr. Quadt warns that extrusion has limitations which rule it out for many applications. If casting or automatic machining of small parts is practical, extrusion is likely to be more costly.

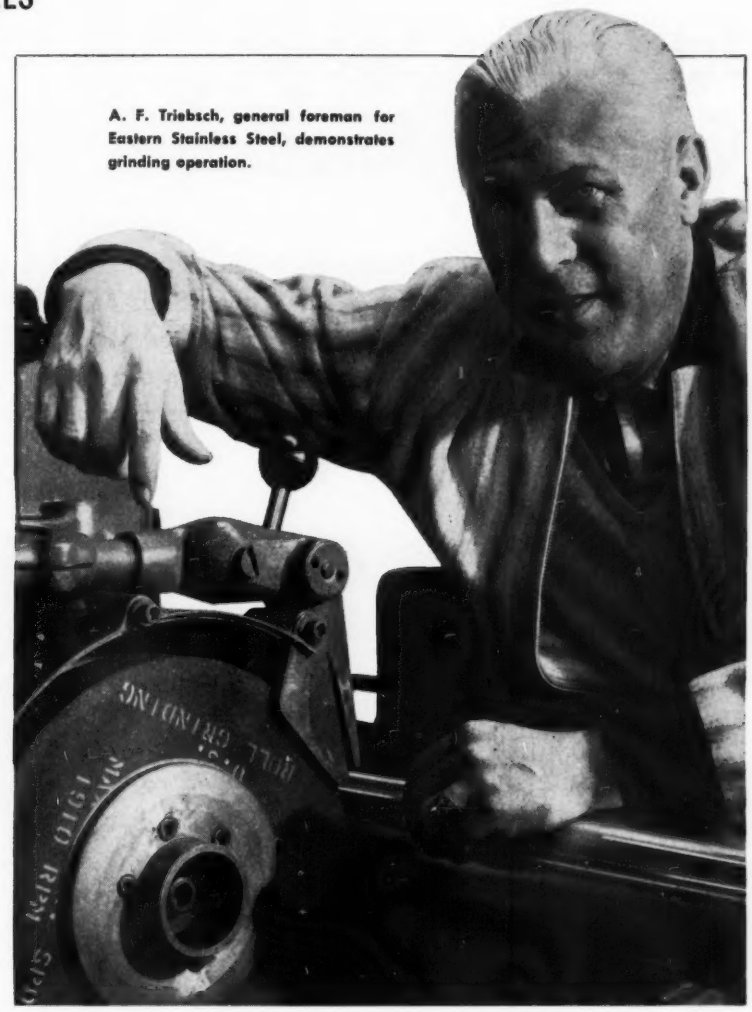
Technology limits the metals and alloys which can be extruded successfully.

But where involved machining can be avoided, where the cold worked structure gives desired physical properties, where scrap is costly, and where metal is reactive at higher temperatures, extrusion may be an answer as a production process.

• An extra copy of this article is available until supply is exhausted. Write Editorial Service, STEEL, *Penton Bldg., Cleveland 13, Ohio.*

ROLLS FOR A CONTINUOUS STEEL STRIP ANNEALING LINE are awaiting shipment from Blaw-Knox Co.'s National Alloy Div., Blawnox, Pa. Used in annealing furnaces at 1600 to 1675° F temperatures, they're centrifugally cast from a heat resistant alloy (25 chrome-12 nickel type). The barrel sections measure 18 in. in diameter and 55 in. in width. The faces have been ground to a minimum finish of 32 microinches. Trunnions are statically cast, then shrink fitted and welded into the ends of the cylinders

US RUBBER GRINDING WHEELS



A. F. Triebsch, general foreman for Eastern Stainless Steel, demonstrates grinding operation.

Production UP 8%!

"U.S." Grinding Wheels help EASTERN STAINLESS STEEL achieve tolerances of 2/10 of .001" in precision work

In producing stainless steel of great precision, the steel passes through a succession of work rolls under a combined force of 59,000 pounds per square inch. All the rolls must be perfectly round and the tiniest defect must be eliminated. To produce a perfectly flat mirror finish, the rolls have to be 2/10ths of .001" perfect!

This is the kind of work Eastern Stainless Steel Corporation turns out every day. To keep their rolls in perfect balance and symmetry they use "U. S." Grinding Wheels. These amazing wheels allow for no "chatter" or vibration, consequently they never groove the roll. Prior to the use of "U. S." Grinding Wheels, at least an hour a day was lost when the operator had to readjust the machine.

Using "U. S." Wheels, Eastern Stainless Steel found many collateral advantages. Maintenance was reduced by more than 20%. "U. S." Grinding Wheels outlast conventional wheels at a ratio of 4 to 1, an obvious saving of 400%.

You, too, can effect important economies and achieve greater precision by turning your grinding wheel problems over to U. S. Rubber.

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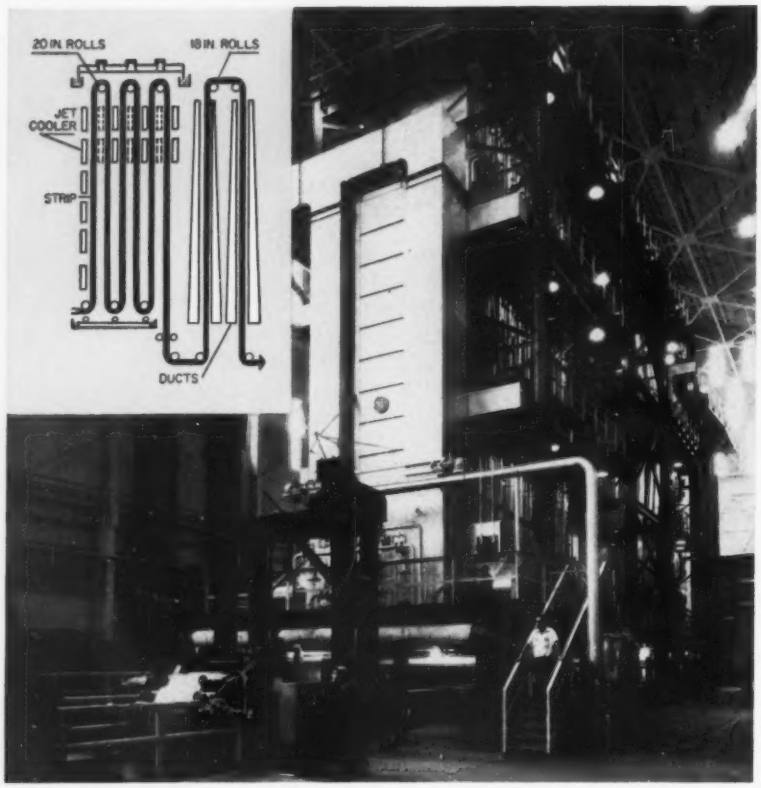
Jet Cooling Speeds Continuous Annealing

Wheeling Steel's new line processes more tin plate than the previous system and promises to save thousands of dollars yearly in operating costs. Capital outlay is modest, and the system uses 10 per cent less floor space than conventional lines. Close temperature control insures better metallurgical properties in the annealed strip



Tin plate enters the tower type annealing furnace. Jet coolers reduce strip temperature in eight passes (inset) vs. 30 for conventional lines

PROCESSORS of steel strip are boosting output of continuous annealing furnaces with jet cooling.

A tower type furnace, with jet cooling, installed at the Yorkville (Ohio) plant of Wheeling Steel Corp., does as much work in 30 minutes as its batch type predecessor did in 120 hours. It was developed by the Industrial Heating Dept., General Electric Co., Shelbyville, Ind.

• The furnace saves floor space and doesn't require a large crew. Better temperature control will permit still more increases in annealing speed.

The unit takes 30 per cent less production line floor space than a conventional continuous furnace of the same capacity. That permitted a 20 per cent saving on the cost of the new, continuous annealing building, says Albert Chamberlin, the company's annealing superintendent.

The unit, operated by a five man crew, requires only eight passes to cool the tin plate vs. 30 to 36 for a conventional system. That makes for lower capital investment. Operating costs are also modest.

Close temperature control is maintained at speeds of 500 to 1200 ft per minute. That helps prevent strip breakage and insures better metallurgical properties in the material.

A mixture of gases (8 per cent hydrogen, 92 per cent nitrogen) is directed onto the strip by 54 jet cooling units. That reduces the tin plate temperature from 900 to 250° F in the holding section. The company plans to increase the speed of the annealing line gradually until it is running at designed capacity (21,000 net tons a month, operating 20 turns a week).

• Better furnace design gives better heat transfer; strip is cooled faster than by previous methods.

Independent jet coolers have their own motors and heat exchangers. They force cooled gases at high velocity against the surface of the strip.

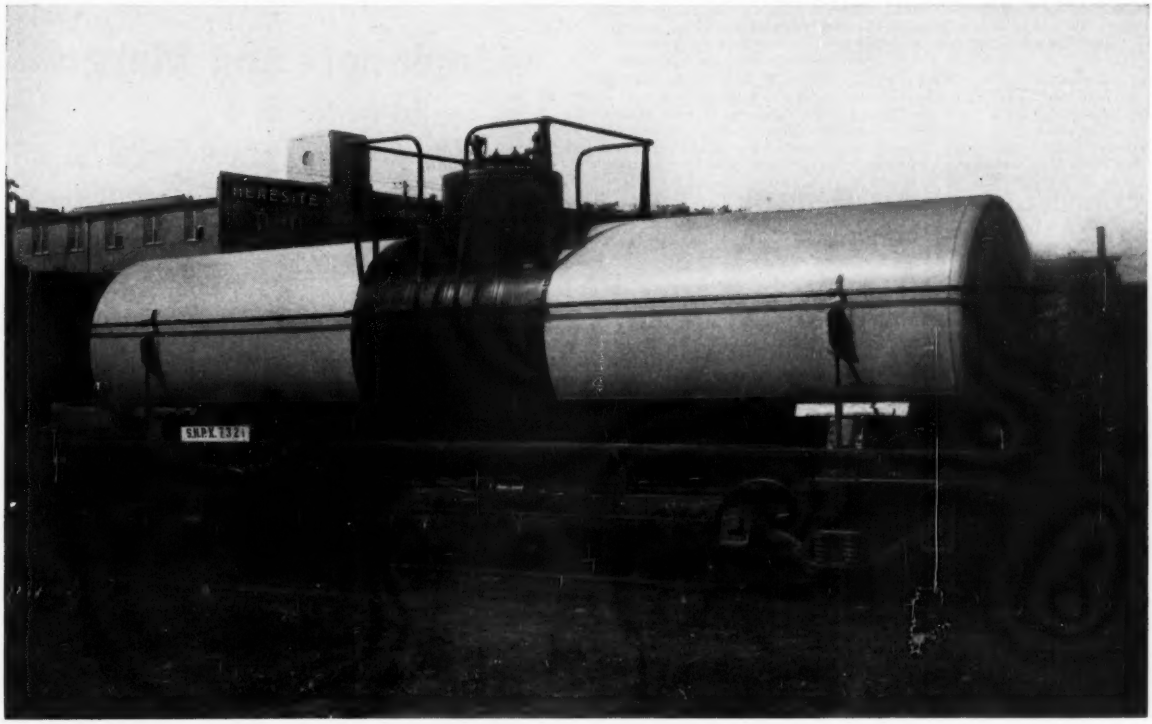
Each of the units is accessible for simple maintenance and flexible operation. Coolers are attached to the furnace in building block fashion; the number of jet units can be easily increased or decreased. Jet cooling is effective at temperatures from 900 down to 100° F for furnaces operating up to 2000 ft a minute, processing up to 60 tons of strip steel an hour.

Design features were tested at General Electric's Industrial Heating Dept. laboratory. A test furnace, with a roll center height of 24 ft, was built to give tin plate four cooling passes. Thermal calculations were verified, and mechanical behavior of the strip was evaluated at wind velocities up to 120 mph.

HERESITE

REG. U. S. PAT. OFFICE

TANK CARS LINED WITH HERESITE FOR HIGH RESISTANCE AND EASE OF CLEANING



Light colored HERESITE coatings are now available for tank car lining, and are of special interest for cars handling food products. These light colored linings as well as the familiar dark HERESITE linings are all made from *pure phenol-formaldehyde* resins long known for their superior qualities.

Since 1946 more than 2000 tank cars have been lined with HERESITE for the transportation of chemicals, food products, and other industrial commodities.

HERESITE & CHEMICAL COMPANY

MAIN OFFICE & PLANT—MANITOWOC, WISCONSIN

EASTERN DIVISION—GARWOOD, NEW JERSEY

Canada: Dominion Rubber Company, Ltd.
Montreal, Quebec

Europe: Aluminium-Schweisswerk A. G.
Schlieren-Zurich, Switzerland

In 1946 J. Gordon Lippincott and Walter Margulies began what has proved to be one of the nation's most successful industrial design firms. Here their firm has chosen the new, exciting patterns of Sharonart* as the material for their advanced design room air conditioners.

Eliminating the conventional box-like unit Lippincott & Margulies have taken advantage of the principle of thermoelectric refrigeration and the beauty of Sharonart* to design units that are both attractive and functional. Fans, housed in the base or back of these units, force air over the cooling elements and circulate it throughout the room. Housings of perforated and painted or plated Sharonart* give the units added beauty while practically eliminating wear.

Tomorrow's room air conditioners designed by Lippincott and Margulies with SHARONART* Patterned Steel

Sharonart* . . . the greatest advance in design steels in a decade . . . brings unequalled versatility to product engineers. Virtually any pattern can be rolled into one or both surfaces of stainless or carbon steels. It can then be fabricated as easily as plain steel . . . perforated, drawn, roll formed, stamped with few limitations. It can be painted, plated or coated by standard methods.

Here's new beauty, new style for your product without expensive retooling. Here's the ideal material for wear areas for most Sharonart* patterns hide scratches, fingermarks, etc.

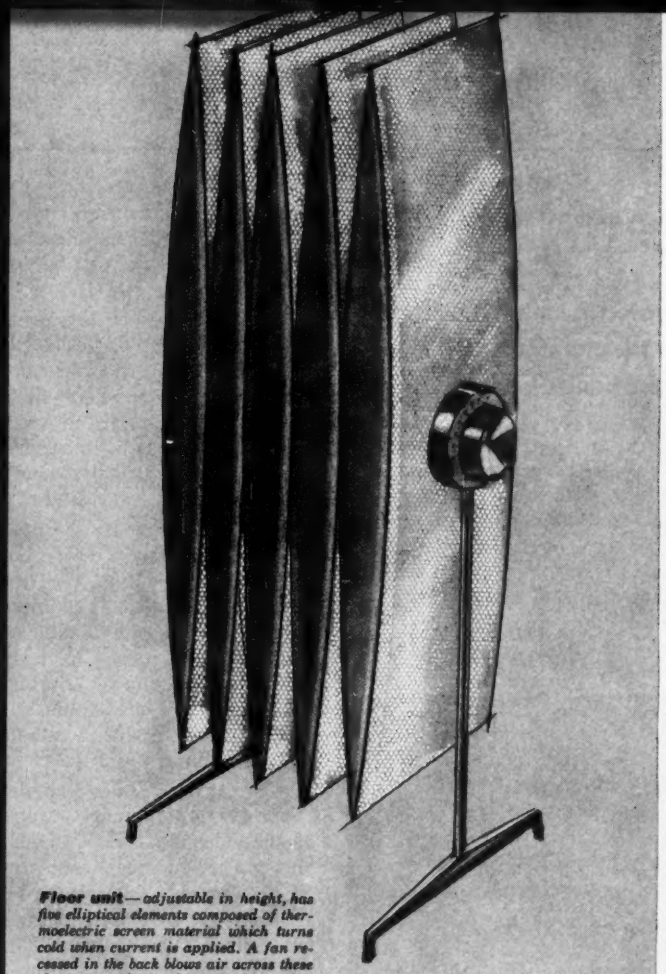
Sharonart* is available in big production coils in a wide range of gauges and widths. Get the complete story, write for literature today.

Sharon Steel Corporation, Sharon, Pa.

*TM

Year 'round room divider—*The thermoelectric elements are held between perforated sheets of textured Sharonart* and air is forced up by fans located in the base and cooled as it passes over these elements. Used as radiant heater in winter.*

SHARONSTEEL **SHARON** *Quality* **STEEL**



Floor unit—*adjustable in height, has five elliptical elements composed of thermoelectric screen material which turns cold when current is applied. A fan recessed in the back blows air across these elements and circulates it throughout the room. Housing of Sharonart® reduces wear, adds beauty.*

Portable unit—*Star shaped form on top is the refrigeration element and air is forced up by a centrifugal fan located in the base of the unit. Sharonart® is used in both tower and ring.*

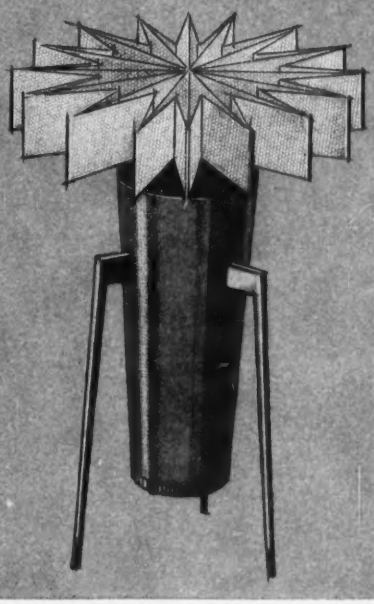
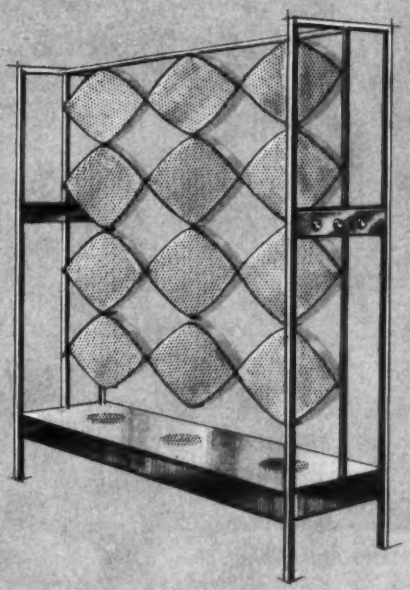


Table unit—*The upper half is made up of a thermoelectric element and air is blown up and through by a centrifugal fan mounted in the base. A removable pan is provided to collect any moisture which may form on the sides. Fins and base of contrasting patterns of Sharonart®.*



Decorative room divider—*Perforated Sharonart® provides unlimited design possibilities for large room units. Thermoelectric units are contained in perforated Sharonart® housings, fans in base of harmonizing Sharonart® pattern.*

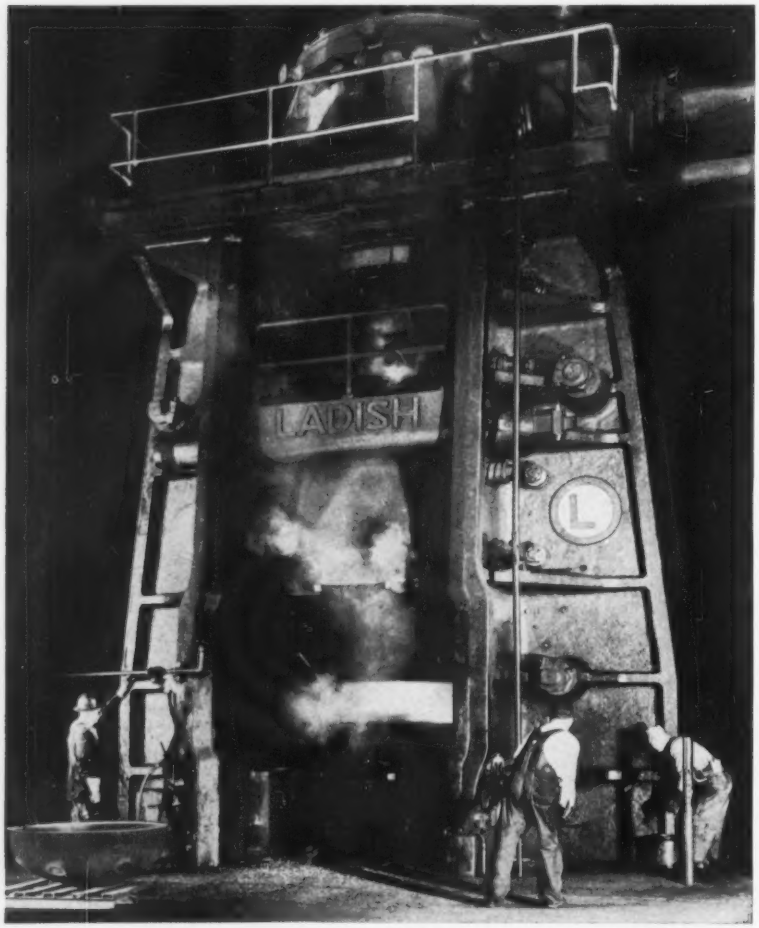
Tool Material Search Is On

New high property alloys have created a need for machining boosts that may come only from better tools. One new tool already is proving itself in aircraft-missile field

THE NEXT real leap in machining efficiency could well come from new tool materials. Many researchers figure new materials, or wholesale modifications of present ones, are the best bets to solve the inescapable problems of cutting today's high property alloys. They also reason the new tooling could make substantial gains in removal rates on our bread-and-butter metals.

One such tool material, just announced by the Farnham Div., Wiesner-Rapp Co. Inc., Buffalo, outperformed others by about 12 to 1 on experimental cutting of a high alloy stainless steel to be used in a new superaircraft.

Arthur J. Wiesner, president, feels that the new tool will be of vital importance to the aircraft and missile industries where all of the newest alloys are being used, and it will have "many important uses in the entire field of fabricating products made of any kind of steel."



NEW DROP FORGING HAMMER can produce closed impression die forgings weighing over 22,000 lb. It has a 96 in. vertical stroke between twin rams and can develop over a million ft-lb of kinetic energy. A force of over 100,000 tons in exerted at the moment of impact. The unit was designed, constructed, and installed by Ladish Co., Cudahy, Wis., for its main plant. It uses octagonal or round closed impression dies up to 96 in. and rectangular dies up to 72 in. wide and 200 in. long

• **The Problem**—Under normal machining conditions, the stainless alloy work hardened as cutting pressures were applied to it. Farnham sent some of the alloy to Horace A. Frommelt, director, Spring Garden Institute, Philadelphia, with the request to look for a solution to the machining problem.

The answer: After experimentation at the institute's Metal Removal Center, Mr. Frommelt and his project engineers came up with a milling cutter of copper-impregnated powdered iron with locked in carbide and ceramics. The cutter had a longer tool life than anything else tried. It also had less vibration and produced a smoother finish.

Farnham is ready to start production of the new cutting tool.

Backlogs

That word has special machine tool builders grinning. Orders continue to come in from a wide group of customers . . . there's no flood of business, but nearly every builder has enough on the books to make the first half of 1960 look good.

The business puts specials squarely on the uptrend with builders of standard machine tools, and it's leading to some optimistic estimates on machine tool business for next year. One builder told STEEL he figured machine tool shipments in 1960 could hit $700 million, roughly twice what they will total this year.

The increased tempo in the order rate also spells the end of the extreme buyers' market in the specials in which prices were sometimes held periously close to building costs.

? Why ?

WhaT

WHAT? . . . An entirely new concept in socket set screws—capable of delivering the highest degree of holding power ever attained . . . is now available! The new P-K® W-POINT provides 30% more back-out torque . . . 50% more resistance to vibration . . . 50% more resistance to rotary slippage!

WHY? . . . Because ordinary cup point set screws fail to meet today's exacting application requirements, and the increasing demand for component reliability. Because of the pivot point built into the cup, the W-POINT tracks cleanly and uniformly. Its impression upon the work is even in depth and shape at all points on the circumference, producing intimate frictional contact on both flanks of the cup. The new P-K W-POINT reduces "wobble" caused by the required tolerance clearances between screw threads and the tapped hole—minimizes the "tipping" effect of key tightening—contributes increased contact areas for stronger, more dependable holding power than ever before possible.

HOW MUCH ?

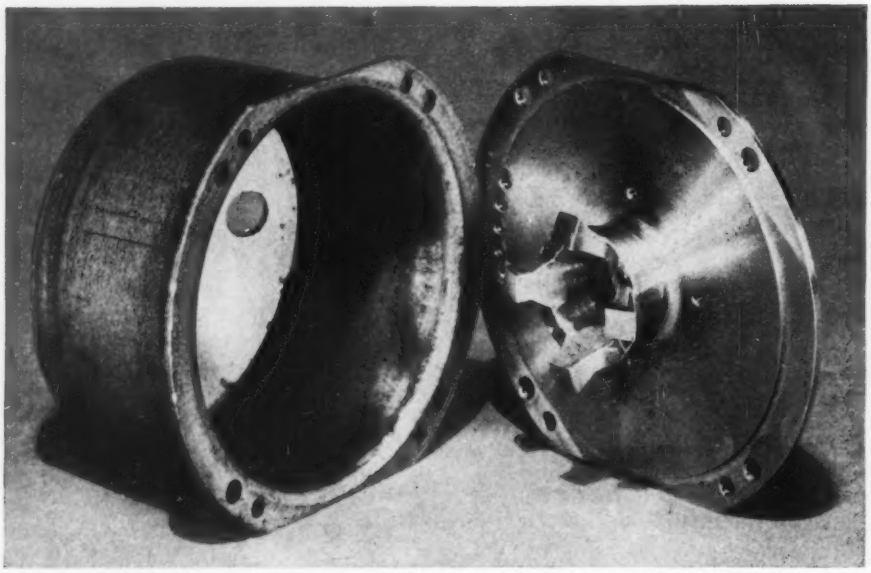
HOW MUCH? . . . Not one penny more than conventional set screws. You get all the advantages of this revolutionary improvement in socket set screws—*at no increase in price!*

the new W-POINT SOCKET SET SCREW by PARKER-KALON®

PATENT PENDING

Perhaps your engineering department would like to test the new W-POINT. Ask your P-K Industrial Distributor for complete information and samples, today, or write to P-K direct for technical bulletin No. 1106.

PARKER-KALON, *a division of General American Transportation Corporation. Clifton, New Jersey. Offices and Warehouses in Chicago and Los Angeles.*



The Navy used to make the housing (left) and inner pole (right) for a fire control gyro from a 50 per cent nickel iron. By switching to magnetic ingot iron, the service branch saved money (see table) and insured an ample material supply

Material Change Cuts Costs, Insures Ample Metal Supply

Savings of 88 and 36 per cent were realized on two parts. This is an entry in the Cost Crisis Awards Competition

A CHANGE in material specification added up to two big benefits for the U. S. Naval Avionics Facility, Indianapolis: It slashed material cost (88 per cent on one part) and solved the problem of having sufficient materials on hand.

The product is a gyro for controlling the firing of guns or rockets and the release of bombs from military aircraft. It is described as a magnetically constrained eddy current device.

Originally, a 50 per cent nickel iron was specified for parts of the gyro, in sheet form and in bars for forging. When work on the product was started, sheets for the housing cost 90 cents a pound; they're now $1.52. Forging bars were similarly priced. Machining costs were considered excessive.

The problem was discovered at the time of the initial work (Korean War period) because supply of nickel was short and deliveries were badly extended, says Thomas G. Harvey, physical metallurgist.

• **The engineering department proposed that magnetic ingot iron be substituted for the nickel iron.**

The magnetic material is produced by Armco Steel Corp., Middletown, Ohio.

The nature of the application requires a soft magnetic material (high permeability, low remanance). Materials in this class include the nickel iron alloys, silicon electrical steels, and the low metalloid irons.

Silicon steels were considered for the gyro parts but were rejected on the basis of formability (one part must be drawn), and availability in bars was poor. Another factor in the thinking was that the material was used in a direct current device where the poor resistivity of the magnetic ingot iron does no harm. (Eddy currents are not a problem in direct current cores.)

Inner Pole Saving: 36%

	Nickel Iron	Ingot Iron
Material Cost	$ 2.50	$0.33
Machining Cost	12.25	9.10
Forging Cost	same	same
TOTAL COST	**$14.75**	**$9.43**

Housing Saving: 88%

	Nickel Iron	Ingot Iron
Material Cost	**$0.85**	**$0.10**
Drawing Cost	same	same
Machining Cost	same	same

Parts were made from ingot iron, annealed, and then aged. When the gyro was assembled and tested, it performed satisfactorily.

• There is no significant difference in drawing or forging nickel iron or magnetic ingot iron. The cost cutting in this case was achieved through raw material and machining changes.

Present prices of nickel iron range from $1.50 to $1.55, depending on its form. Ingot iron, which cost 15 cents a pound when the work was started, is now priced between 17 and 20 cents a pound. With a price differential of that magnitude, material cost savings are extremely significant.

The material cost of the housing is 85 cents for the nickel iron and 10 cents for the ingot iron. The drawing time for both materials is essentially the same, and as the machining time is not great, the difference can be disregarded. The saving in material cost is 75 cents, or 88 per cent.

The material cost of the inner pole of nickel iron is $2.50. For the ingot iron, it is 33 cents. Forging costs are the same. The machining cost of the nickel iron part (based on a direct labor cost of $3.50 an hour) is $12.25, and for the ingot iron is $9.10.

The combined saving in material and machining is $5.32, or 36 per cent.

• An extra copy of this article is available until supply is exhausted. Write Editorial Service STEEL, *Penton Bldg., Cleveland 13, Ohio.*

Hydraulic Buffers Halt Ingot Buggies

Compression type units absorb shock of sudden stops when cables break or controls fail

TREND in steel plants: Use of hydraulic buffers to stop ingot buggies when controls or cables fail. Six of the stops have been installed recently in three midwestern and western steel plants by Dravo Corp., Pittsburgh.

Buffers used in all three installations are compression type units with spring returns.

• At one plant, improvised emergency stops were tried. Later, they were replaced by hydraulic units.

The self-propelled ingot buggy weighs 30 tons empty and travels 725 fpm. Limit switches were provided at the end of the runway. But greasy rails or electrical failure often allowed the buggy to reach the end of the runway at full speed. Result: Costly repairs and lost time.

Several railroad ties were lashed to the end of the runway at the mill receiving table to provide a simple emergency stop. That wasn't effective; in one accident, the drive motor and cradle were sheared off.

Later, steel ingots replaced the railroad ties. Addition of ingots to provide a more positive stop caused increased buggy damage.

A hydraulic buffer, similar to those used successfully on bulk material bridges and unloaders, was installed on the runway. It provides positive stops and prevents buggy damage.

• Dravo's largest installation includes four buffers, two at each end of the buggy runway.

The cable drawn ingot buggy serves 20 soaking pits on a 600 ft runway. It weighs 90 tons loaded, and travels at 1000 fpm. Automatic controls send the buggy to any of the ten stations and back to the mill approach table at the push of a button.

Reinforced outriggers on the buggy strike the buffers. Cables have broken a number of times since the buffers were installed, but no buggy damage has been reported.

Granite City Steel reports up to 125 heats for tapholes "cast" with Permanente 165 Ramming Mix

New technique developed in cooperation with Kaiser Refractories helps step up productivity of company's open hearth furnaces

Granite City Steel—whose outstanding modernization and expansion program has made it one of the nation's most efficient steel producers—has developed and proved a technique for "casting" tapholes when a furnace is down for ground rebuild. The "casting" practice (described in detail below) has produced the following exceptional results for four recent Granite City tapholes:

Furnace No.	Capacity	Taphole Life
22	250 T	125 heats
23	250 T	113 heats
24	250 T	92 heats
25	400 T	80 heats

Operators who have switched to Permanente 165 Ramming Mix consistently report exceptional performance—whether for new tapholes, for hot tapholes, or for furnace bottoms!

Permanente 165 is made from high purity Kaiser Periclase refractory grains (94-96% MgO) and ceramically bonds itself into a crystalline mass at relatively low temperature, providing fast furnace availability. This monolithic structure has exceptional volume stability, maximum resistance to hydration and to attack by iron oxide and slag. For furnace bottoms, its high density (averaging 175 pounds per cubic foot after firing) assures longer life.

Make your own comparison test and see how much more life you get with Permanente 165 Ramming Mix. Your Kaiser Refractories sales engineer will be glad to show you this taphole casting technique or to help with any basic refractories job.* Ask to see the new 30-minute color movie, "Progress in Modern Basic Refractories." Your Kaiser Refractories Sales Representative or Regional Office will be glad to make the arrangements.

*Ask for details on the new K/R Gunning System.

Call or write Kaiser Chemicals Division, Dept. S9224, Kaiser Aluminum & Chemical Sales, Inc., at any of the regional offices listed below:

PITTSBURGH 22, PA. . . . . 3 Gateway Center
MEXICO, MO. . . . . Mex-R-Co Bldg.
OAKLAND 12, CALIF. . . . . 1924 Broadway

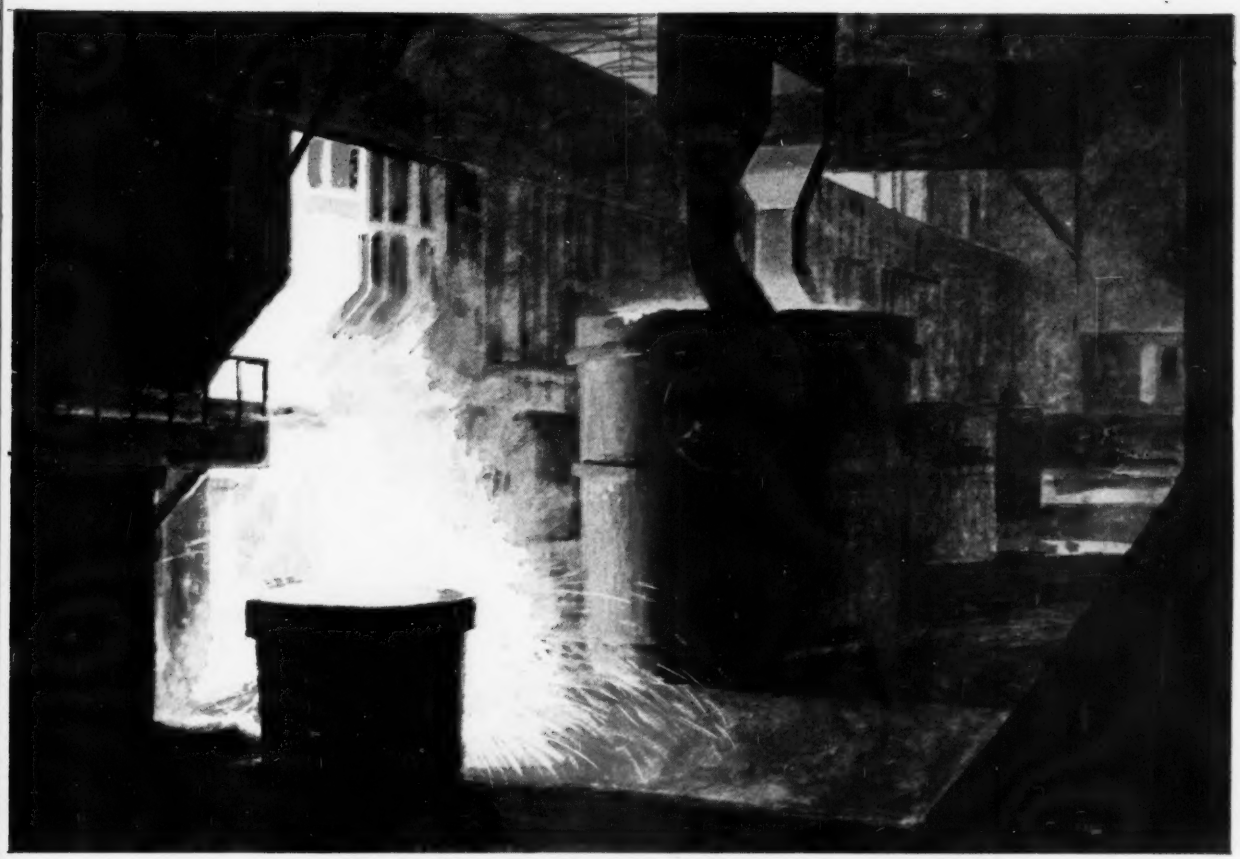
KAISER REFRACTORIES

REFRACTORY BRICK & RAMMING MATERIALS • K/R GUNNING SYSTEM
CASTABLES & MORTARS • PERICLASE • DEADBURNED DOLOMITE • ALUMINAS

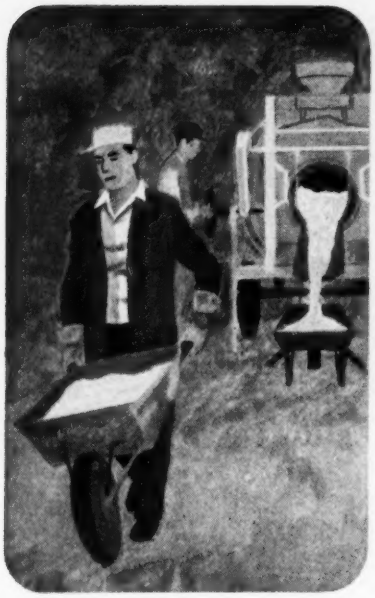
1 In the Granite City Steel practice developed with Kaiser Chemicals, the first step is to dig out the hole to a diameter of approximately thirty inches. Although practices will vary from shop to shop, this digging usually goes down to brickwork under the pipe, and includes two to three feet of the flat in front of the pipe.

2 Next, a ¼-inch steel plate is welded to the casting in back of the furnace and a hole for the taphole pipe is cut in it at the proper height. The pipe is then set at the proper angle, with the back end protruding through the plate and the front end blocked up with brick . . . ready for the casting forms.

3 Carpenters erect a three-sided wooden form, following the indentations of the back banks as closely as practical. A "plug" nailed inside the front wall of the form fits into the pipe, supporting it so that blocking can be removed. Pipe is now welded to back plate . . . form solidly braced . . . and deck built around form.

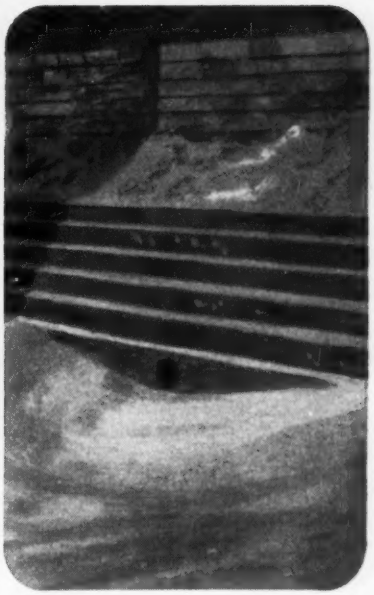


Open hearth furnaces at Granite City Steel Company, Granite City, Illinois.

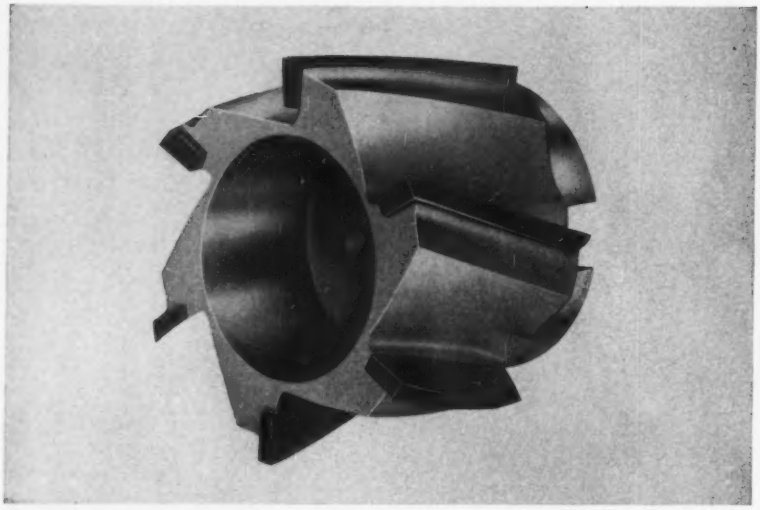


4 The Permanente 165 Ramming Mix is mixed in either regular mixers or mixer trucks. From seven to nine per cent water is used. Mix is at proper consistency when a high-frequency cement vibrator immersed in the Permanente 165 produces a "jelly-like" appearance.

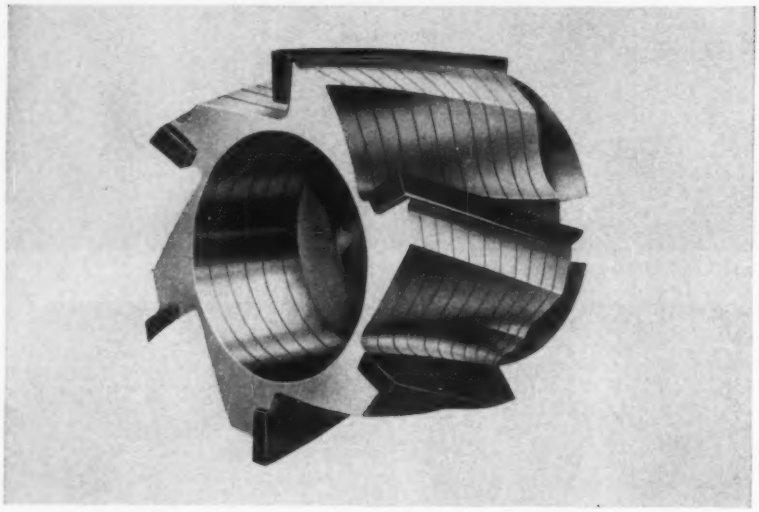
5 When the Permanente 165 mix is poured into the form, the vibrator is used to achieve uniform mix density around the entire pipe. *This is the important feature* of the cast taphole: uniform density of mix at least six inches thick around pipe. Excessive vibrating must be avoided to prevent floating out of bond.



6 Although forms can be removed after only three or four hours, life is improved if the Permanente 165 casting is allowed to cure for several days. After the form is removed, the small section of the flat in front of the casting can be filled either by ramming or casting.



This is a conventional 3 in. diameter shell end mill. Spiral Carbide Tool Co.'s selling price is $78 each on quantity orders of six



This is a wafer lamination, 3 in. diameter shell end mill. Spiral's selling price is $49.25 each when this type is made in quantities of six

Process Cuts Cutter Costs

DRAMATIC reductions in the cost of end mills has resulted from a new manufacturing method at Spiral Carbide Tool Co., Detroit. The new cutters are laminated from preformed metal wafers, eliminating most of the machining that ordinarily goes with making cutter bodies.

The wafers (stamped to shape) are assembled on arbors and high speed steel or carbide cutting tips are brazed in place. The brazing operation combines the entire assembly into a solid mass, say Spiral executives.

The new tools have a greater density than their predecessors, says Spiral. Increased density dampens vibrations, tends to eliminate tool chatter. Reduction of chatter and a reported increase in heat dissipation combine to boost tool life.

Spiral says it will make and market its own tools, using the new method. It will permit other tool manufacturers to use the process under license.

Machining Time Trimmed With Special Tool

One pass reaming and chamfering with a single tool cut machining time 65 per cent for the Sterling Township, Mich., plant of Ford Motor Co. It replaced three operations.

The job: Reaming and chamfering two inside holes on auto and truck differential case assemblies. About 8000 are machined daily.

• **Operation**—The joined, two part differential case is placed in a fixture. Reaming is done by four carbide tipped reamer blades. When the part is compressed against the tool, a cam pin swings the double ended, carbide tipped blade out to chamfer both inside holes.

Before: Three separate operations were necessary. A back chamfering tool did two operations with the case and cover separated. Reaming was done on another machine.

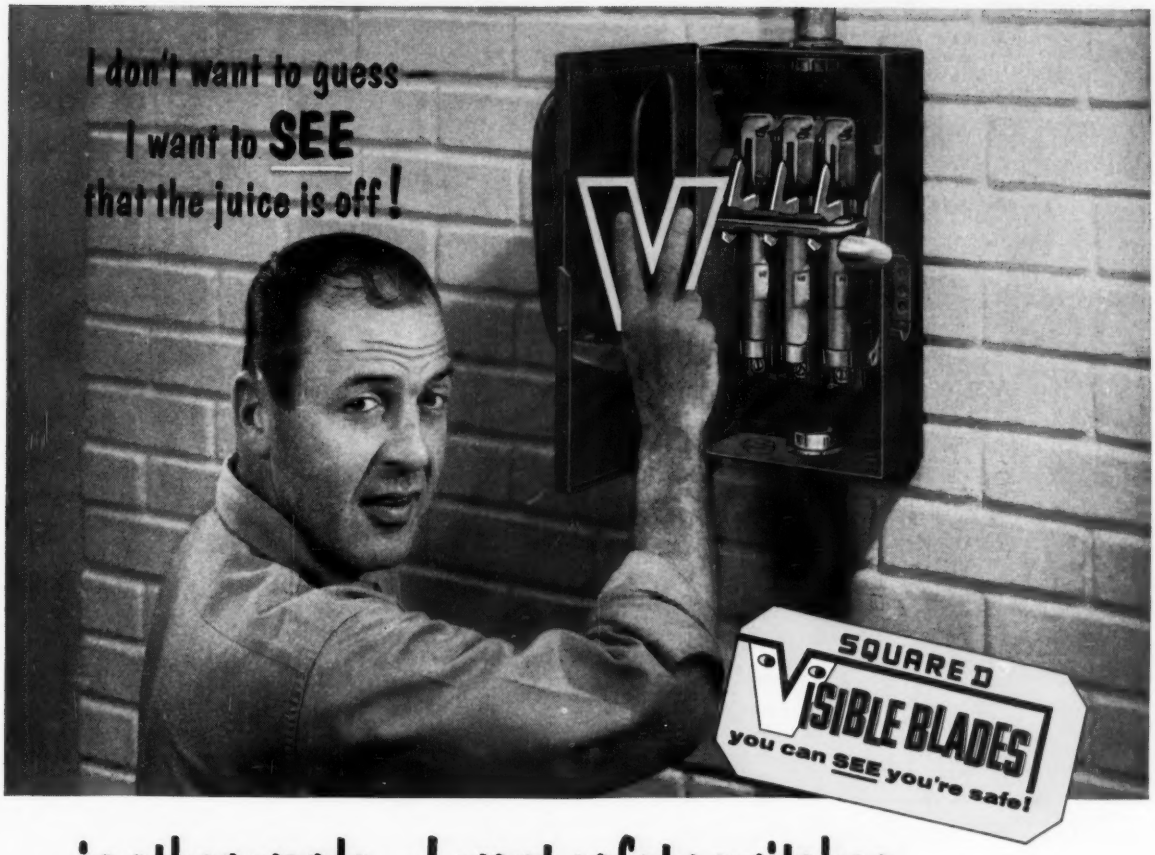
The tool (designed by Cogsdill Tool Products Inc., Oak Park, Mich.) is used on a special machine driven by a ½ hp motor turning at 850 rpm.

Switch to Harder Carbide Slashes Machine Cycle

The right carbide tips in 24 special tools in an automatic machining setup tripled output by cutting a 180 second operation down to 61 seconds. The gain was made without sacrificing the life of turning tools.

Workpiece: Cast iron alloy pulleys are machined. The part (3 in. in diameter) is bored and machined by tools in six stations on a single spindle machine. Loading and unloading are automatic.

• **Faster Machining**—Turning and boring speeds were stepped up when tool tips were changed to Grade K7H, the hardest carbide made by Kennametal Inc., Latrobe, Pa. Turning speeds now range between 610 and 820 sfpm. Boring speeds are between 180 and 430 sfpm. Original tooling permitted turning speeds of 180 to 410 sfpm and boring and drilling at 70 to 75 sfpm.



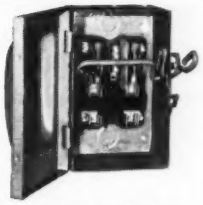
...in other words—I want safety switches with VISIBLE BLADES!

The men who pull the switches will tell you what can happen when a switch, *believed* to be open—*isn't.* A lot of things can happen—and every one of them is bad. Personnel is in danger. Motors can single-phase. Machinery and work can be damaged. Down-time can skyrocket.

Doesn't it make sense to insist on Visible Blade construction which gives you a road block against any of these possibilities? Doesn't it make equally good sense to insist on the safety switch which gives you that construction—plus a lot of other performance advantages?

NEW!

TYPE LD SWITCH

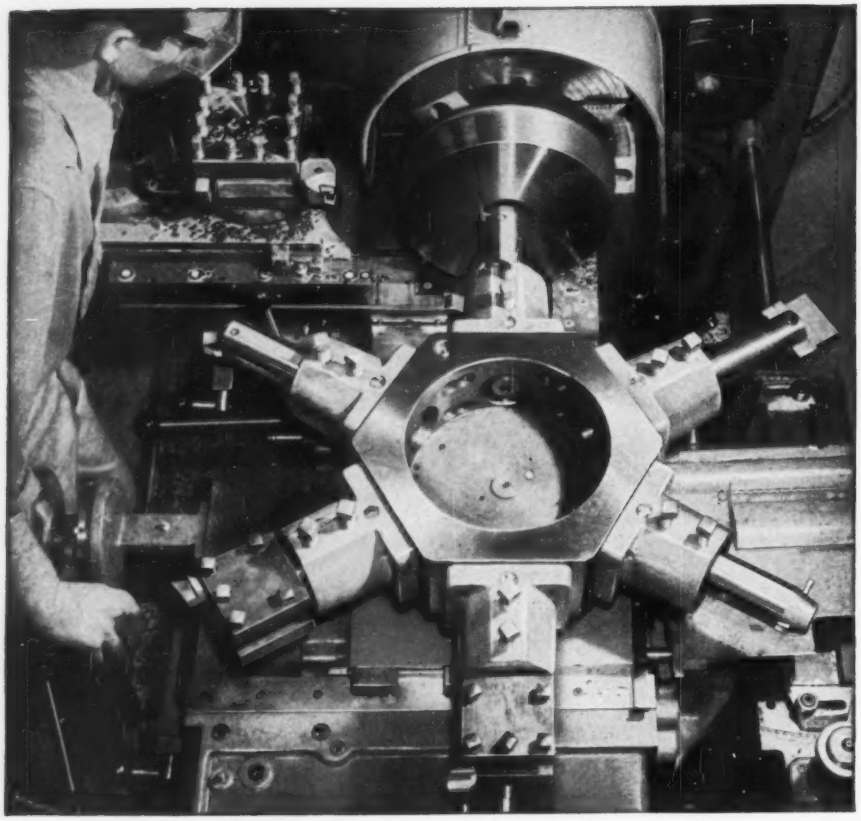


Quality Features at Low Price

Spring-operated quick-make, quick-break • Box lugs — Easy to wire — No looping • Compact enclosure, yet lots of wiring space • Positive pressure (spring loaded) fuse clips • Full horsepower ratings

EC&M HEAVY INDUSTRY ELECTRICAL EQUIPMENT...NOW A PART OF THE SQUARE D LINE

SQUARE D COMPANY



Expert setup gets more work per chucking

How manufacturer uses C/F turret lathe to produce variety of chuck bodies with only one tool change

To do the job, the manufacturer selected a Gisholt 1L Saddle Type Turret Lathe with a cross-feeding hexagon turret. A 15″ 3-jaw air chuck holds down chucking time. One set of adjustable serrated jaw bases handles the different workpiece sizes for first machining operations. A quick-indexing square turret on the cross slide carries turning, facing and chamfering tools, which work simultaneously with tools on the hexagon turret.

Three stub boring bars on the hex turret bore, counterbore, recess and back face. Because size is set with the cross-feeding turret, these same boring bars are used on different part sizes. Also on the hexagon turret are 2 box-type tool posts for facing, boring or recessing—used for different size workpieces because of the cross-feeding feature. A threading attachment lets the manufacturer thread the hubs, and a taper attachment handles up to 8 inches taper per foot when required.

The sixth tool on the hex turret, a spade cutter, is used for final sizing and is the only special tool changed for each job.

Simple, low-cost tooling combined with the cross-feeding hexagon turret offers maximum efficiency in handling various sizes of similar parts. The rugged Gisholt MASTERLINE Saddle Type Turret Lathes have the speeds, feeds and power to complete the work in the least amount of time. Call your Gisholt Representative today, or write Gisholt for literature.

MASTERLINE GISHOLT SINCE 1887 GISHOLT

GISHOLT MACHINE COMPANY

Madison 10, Wisconsin, U.S.A.

WRITE TODAY for complete set of Gisholt MASTERLINE Saddle Type Turret Lathe Bulletins.

TURRET LATHES • AUTOMATIC LATHES • SUPERFINISHERS • BALANCERS • PACKAGING MACHINES • MOLDED FIBERGLAS PLASTICS

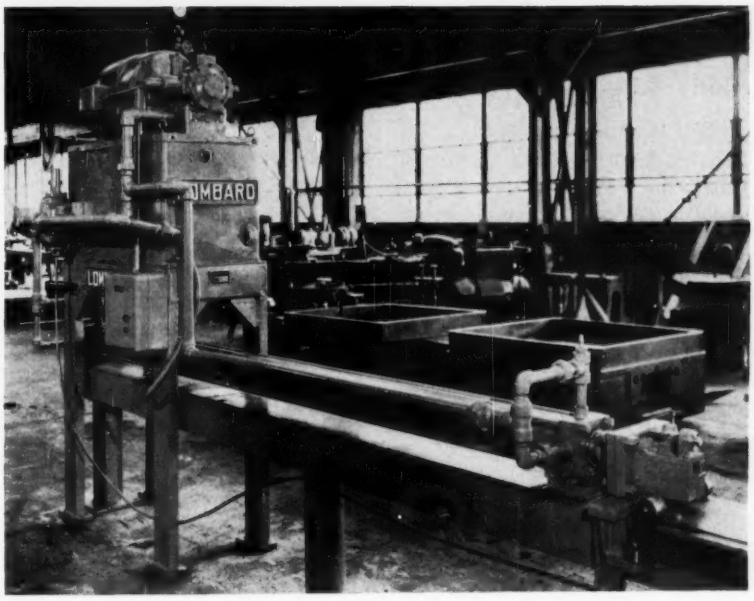
Hydraulic Drawbench Handles Stainless Steel

VERSATILE is this 10,000 lb drawbench, designed primarily for plug and bar drawing of seamless and welded stainless or alloy steel tubing. It handles diameters from ¼ to ½ in.

The hydraulically operated unit may also be used for drawing other standard or special metals and to meet unusual operating conditions.

A hydraulic cylinder drive permits easy adjustment of draw and return speeds up to 75 fpm. Pulsations and shock have been eliminated. Acceleration and deceleration are smooth and uniform. The operation may be stalled at any point along the draw length to change draw conditions or for inspection.

For more information, *write* Lombard Corp., 639 Wick Ave., Youngstown, Ohio.

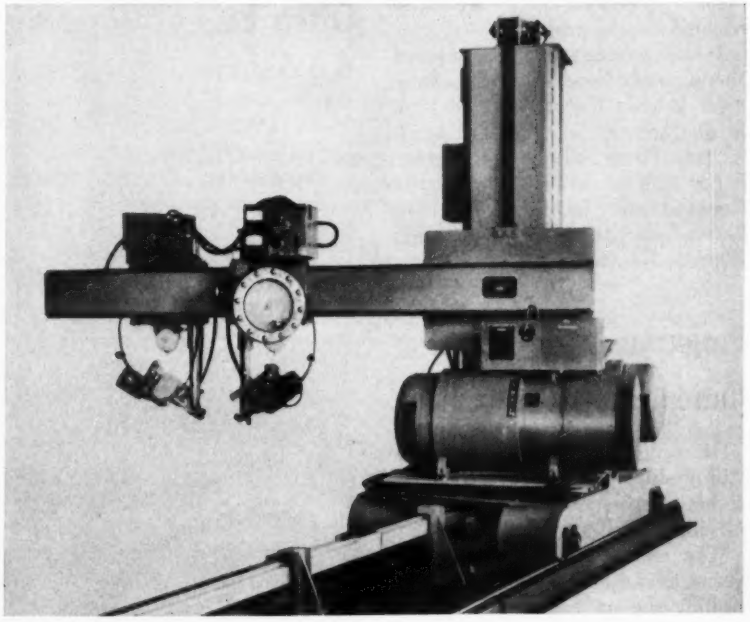


Welding Head Manipulator Does Complex Contours

AUTOMATIC welding of large and small, simple and complex contoured products is facilitated with the Welco Robot manipulator. It can also be used for filletwelding of tapered building columns, cover plates, bridge girders, and other structural fabrications.

The manipulator features a simultaneous boom, carriage column, and base travel. It can be furnished with single or dual heads for floating or fixed operations.

For floating operation, the heads are mechanically controlled to float horizontally along the boom and up to 12 in. vertically. Controlled independently or simultaneously, the heads can be rotated radially 360 degrees around the vertical float headshaft, yet can be locked in any position. Even irregularly shaped pieces can be easily followed and



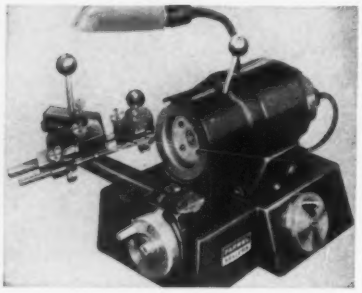
automatically welded with a minimum of setup time.

For more information, *write* World Electric Co., 4614 Prospect Ave., Cleveland, Ohio.

Drill Grinder Sharpens Many Kinds of Drills

A NEW chuck arrangement on the Farrel-Sellers 1 G-A drill grinder makes the unit easy to load and provides a smooth, accurate method of grinding.

It holds the drill so that its axis is in correct relation to the axis of



the wheel. That automatically provides proper clearance, increasing correctly from the periphery to the point of the drill. Small drills which are usually discarded when broken (because it is too tedious and expensive to reclaim them) are easily restored on the grinder.

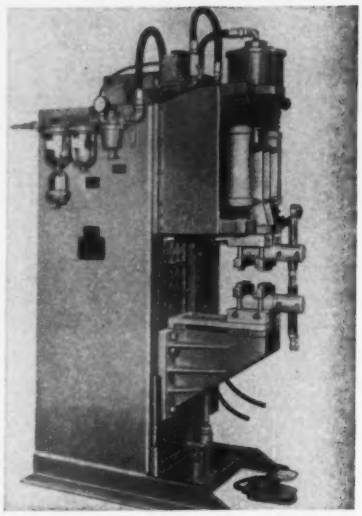
It will handle straight or tapered shank, right-hand, two lip twist drills in sizes from No. 70 to 1 in. in diameter, to any included angle of point from 60 to 150 degrees.

For more information, *write* Consolidated Machine Tool Div., Farrel-Birmingham Co. Inc., 565 Blossom Rd., Rochester 10, N. Y.

Projection Welder Has Current Slope Control

THIS single phase projection welder will produce welds meeting the most severe requirements, says the manufacturer.

The machine has a special heat vector device for automatically controlling the up and down slope of



the welding current. It provides the exact heat cycle needed to produce the strongest types of welds.

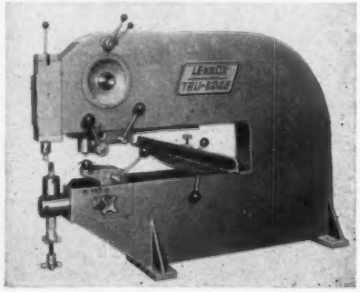
Nonbinding, noninhibited ram performance and instant followup in controlling weld properties are other features of the machine. Need for replacing or regrinding the ram has been eliminated; a slight turn of the shaft in the ball bearing sleeve's housing provides a new wearing surface. Controls may be added for fully automatic operation.

For more information, *write* Universal Electroweld Div., Electric Arc Inc., 152-1 Jelliff Ave., Newark 8, N. J.

Shearing, Forming Machine Offers Ease of Operation

PORTABILITY and ease of operation are built into the Lennox Bench Model TE-100 Metlmastr shearing, forming, and piercing machine.

The unit has an edge cutting capacity up to 12 gage in mild steel plate and 16 gage in stainless steel. Its variable stroke length can be adjusted from 0.022 through 0.110 in. without stopping the motor. The



operator merely sets the stroke pointer at the gage indicated on the scale and the machine is ready for use.

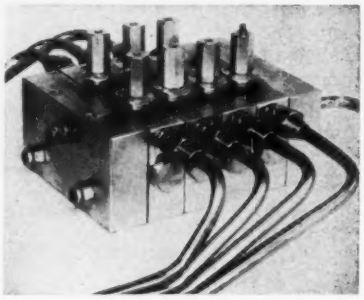
Strokes per minute, from 1750 to 3500, are automatically regulated according to material thickness when the operator sets the stroke pointer. It cuts from 8 to 15 ft of material a minute.

For more information, *write* Dept. 159, Lennox Tool & Machine Builders, Lima, Ohio.

Plugged Lubrication Lines Shown by Reset Indicators

BLOCKED centralized lubrication lines can be pinpointed with Trabon reset indicators. When the blocked condition is cleared, the indicator pin will automatically return to normal position.

The reset indicator is available



in spring pressures from 250 to 2500 psi. The unit is installed in the alternate outlet or test plug cap of each outgoing line from the master and secondary distributors of the progressive Type M or MX lubricating system.

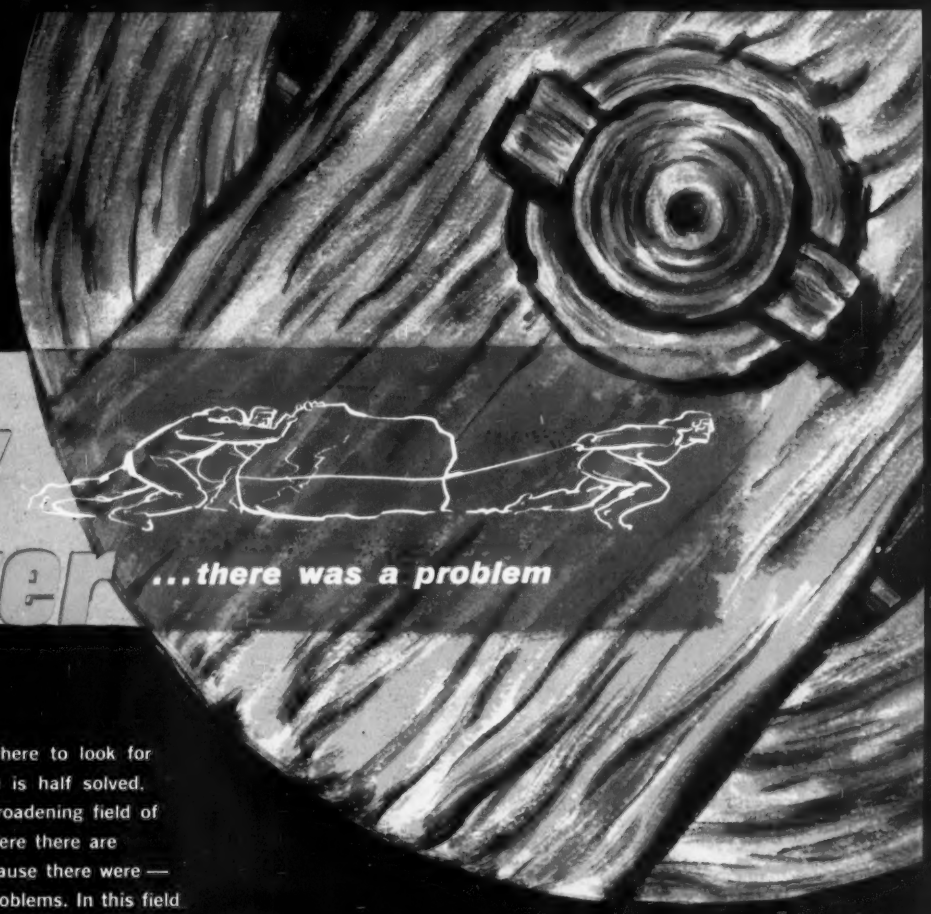
For more information, *write* Trabon Engineering Corp., Solon, Ohio.

Abrasive Belt Grinder Handles Parts 3 in. Thick

SURFACES of bars, strips, blanks, stampings, forgings, diecastings, and sand castings can be ground, deburred, or polished on the Model JC Acme abrasive belt finishing machine.

It has a motorized conveyor belt that carries the work under spring loaded, hold-down rollers and the abrasive belt contact wheel. Mul-

(*Please turn to Page* 111)



for every answer

...there was a problem

Often when you know where to look for the answer, the problem is half solved. Take the exciting, ever-broadening field of nondestructive testing. Here there are all kinds of answers, because there were — and are — all kinds of problems. In this field Magnaflux Corporation is often called "The House of Answers" — for problems like these:

If you are a materials engineer

You may want to know that the material you select for specific characteristics really has those characteristics when fabricated. Or, can you use a less expensive material safely? Can you be sure that your materials will be free of any defects that matter?

If you are a design engineer

You may want accurate stress and load analysis. You may also want to specify a positive way to test your pilot and production models.

If you are a manufacturing engineer

Your problem may be process control—not shooting for perfection, just reliable, consistent quality. You'll need a system fast enough to keep up with production and that fits into the rest of your set-up.

If you are a plant engineer

Your problem may be how to test for cracked parts during preventive maintenance—or in plant layout, how you can place the test equipment that will do the desired job most efficiently.

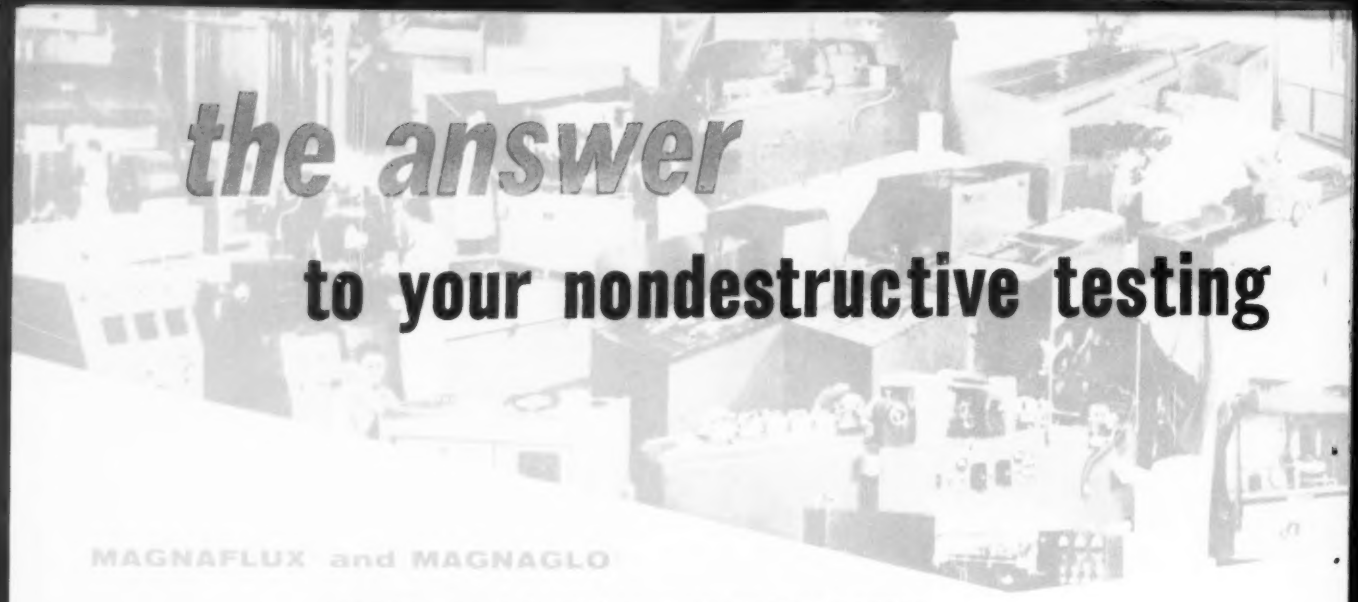
For these and many other nondestructive testing problems **MAGNAFLUX** is often called *"THE HOUSE OF ANSWERS"*

Magnaflux Corporation is a company devoting its entire effort to the systems and equipment for nondestructive testing used by more industries for more testing operations than all others combined.

The Magnaflux Field Engineers and the Engineering and Research staffs back of them have built their careers on finding the right answers to nondestructive testing problems. They are true specialists who take all factors into consideration in helping you find the test system that will solve your problem. Very often you will find the Magnaflux men already have or can develop the exact answer you are looking for, or they usually know who has the answer and will direct you to it.

The following three pages cover some of the major Magnaflux Test Systems and show why so many of today's nondestructive test problems can be solved by one or another of these systems.

MAGNAFLUX CORPORATION
Chicago 31, Illinois

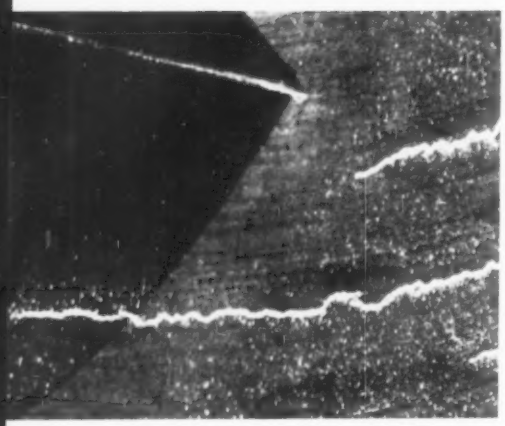


the answer

to your nondestructive testing

MAGNAFLUX® and MAGNAGLO®

most used test for magnetic metals



By far the most common crackfinders used on magnetic metals for critical service, Magnaflux and Magnaglo use magnetic particles and controlled magnetic fields to find all cracks, inclusions or other defects at or close to the surface. Sensitivity is adustable to find either defects as small as a few millionths of an inch or only the grosser ones.

Magnaflux and Magnaglo will find some types of defects that other tests will overlook. They mark defects right on the part. Magnaglo uses fluorescent materials and high intensity black light. Speed of testing is governed solely by production needs, on parts weighing from fractions of ounces to many tons. Fully automatic processing is often provided with the inspector merely "monitoring" parts as they pass through the machine. Cost per part tested is usually even less than for visual inspection alone, and many times more accurate.

Inspection with Magnaglo shows otherwise invisible fatigue cracks in forged part.

ZYGLO® and ZYGLO-PENTREX®

most used test for nonmagnetic materials - fluorescent penetrant, black light.

Zyglo and Zyglo-Pentrex use capillary forces to find cracks—or any other defects open to the surface—in such materials as aluminum, titanium, magnesium, plastics, glass and others. They may be used successfully on rough surfaces where ordinary visual inspection is hard or impossible. All defects are marked directly on the part. Recent improvements have increased maximum sensitivity beyond that of *any other method* in finding and defining certain defects. Near-absolute reliability is assured in leak tests. Adjustable sensitivity for any requirement prevents "over-inspection" and needless rejection. Engineered systems can be full automated.

At any test rate, cost is low; on volume production cost per piece is negligible.

Zyglo reveals and marks serious cracks in stainless steel part.

Copyright, 1959, Magnaflux Corporation

problems may be here

MAGNATEST

Eddy current and magnetic measurement instruments evaluate properties of metals, detect variations, etc.

Magnatest instruments provide an almost magic evaluation of many properties within conductive materials by means of induced eddy currents or magnetic fields that "explore" the part or material.

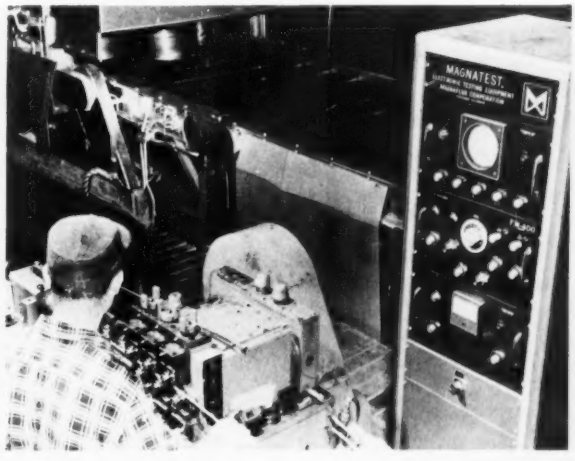
New uses for Magnatest instruments are being discovered continuously, with no limit yet in sight. Some of the purposes for which these units are now supplying precise measurement or evaluation include:

- Measurement of electrical conductivity in absolute units (see illustration). Used to determine material alloy, hardness, heat treat uniformity . . . for sorting of mixed nonmagnetic metals, checking aging of aluminum alloys, detection of fire damage by measuring changes in conductivity, etc.
- Testing nonmagnetic rod, tube and wire at mill speeds to detect laps, seams, inclusions, voids and other defects . . . with automation and recording if desired. (See illustration)
- Precision measurement of DC magnetic fields in geophysics, magnetic investigations, military uses and nondestructive testing of nonmagnetic metals and other related functions.
- Measurement of coercive force for steel property evaluation, for relay and transformer steel lamination stock, etc.
- Rapid, accurate determination of the moduli of elasticity, shear, Poisson's Ratio, and the damping factor of practically any solid materials.

Magnatest instruments for many other applications are also now in use in some of the fastest growing, broadest range fields of nondestructive testing. Magnaflux is the exclusive U.S. representative, using principles developed by Institute Dr. Foerster, Germany. More than 25 different Magnatest instruments are now available through Magnaflux Corporation.

Magnatest FM-110 Transistorized Conductivity Meter, as used to sort copper billets according to conductivity, prior to machining.

(Photo courtesy Ampco Metal, Inc., Milwaukee)



Magnatest FW-400 Rod, Tube and Wire Testing Unit as set up for production inspection of copper tubing at mill speeds.

(Photo courtesy of Wolverine Tube Co., Detroit)

MAGNAFLUX CORPORATION

SONIZON®

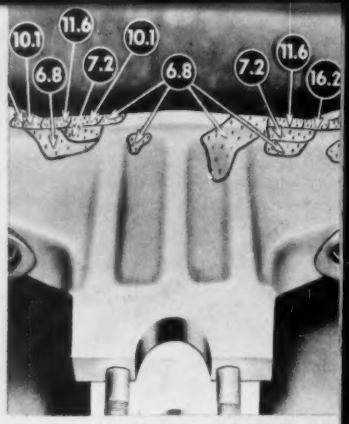
Ultrasonic instruments use sound you cannot hear to measure thicknesses you cannot see —or to find hidden defects.

Sonizon SO-200 portable, direct-reading type instrument used here to measure pipe wall thickness.

Sometimes called "a micrometer with only one arm", Magnaflux Sonizon measures thicknesses from one side as quickly as a crystal probe can be moved over the surface. Sonizon instantly detects thin (or corroded) spots in tank walls; in cast, formed, welded or ground shapes; it also reveals defects deep below the surface including laminations and lack of bond. Instruments are available in a unique portable direct reading type (see illustration) and the oscilloscope type.

STRESSCOAT®

Spray-on brittle coating saves time and cost. Gives overall stress analysis.



Stresscoat applied to prototype aluminum truck beam saddle shows operating stresses and concentration points.

Stresscoat determines stress concentration and measures values in simple or complex shapes, in static or dynamic testing. It predicts where parts would fail, so that they can be correctly designed not to fail in service. This makes possible better products that are lighter, stronger, less expensive to produce and less wasteful of material. Stresscoat is used at all stages—from laboratory tests, through pilot models to production units to be sure stresses remain within desired limits. With new ceramic Stresscoat, parts can be immersed in oil or tested at temperatures to 600° F.

SPOTCHECK

low-cost, fire-safe dye penetrant in spray-on cans

On metal, plastic or other solid materials, Spotcheck provides a low-cost dependable test for medium to large, but still nonvisible, open-to-the-surface defects. Self-contained, pressurized spray cans offer the easy convenient means for handling and applying, or also in bulk. All materials are available in new nonflammable or high-flash formulas.

Spotcheck in-place test for aircraft landing wheel shows crack that is prelude to failure.

Your Testing Problem is "Different?" —Tell Us About It

The applications, uses and answers possible with Magnaflux Test Systems have been barely touched upon in these pages. For lack of room, whole systems have been left out. For instance:

STATIFLUX® . . . electrified particle testing for fired ceramics, glass, porcelain enamel, plastics and other nonconductors . . . with constantly growing use in electronics and missile applications.

PARTEK® . . . filtered particle testing for ceramics and nonporous solids to reveal handling, forming and drying cracks in unfired clay bodies before kiln time is wasted on defective ones.

THERMOGRAPHIC TEST OF HONEYCOMBS . . . Bondcheck is a new fast test for proper bond and integrity in metallic honeycomb sandwiches and certain welded structures, widely useful in aircraft construction, among other applications.

INSPECTION SERVICE

In addition, Magnaflux Corporation maintains its own nationwide Commercial and Field Inspection Service, with plants in 16 principal cities, ready to test one part or one million, on a regular basis or to expand your own test capacity in emergencies.

No matter how unique or how routine your inspection problem, call in the Magnaflux nondestructive testing engineer. For thousands of companies, it has been one of the most profitable steps ever taken.

THE HALLMARK OF *Quality* IN NONDESTRUCTIVE TEST SYSTEMS

MAGNAFLUX CORPORATION

7312 West Lawrence Avenue, Chicago 31, Illinois

New York 36 • Pittsburgh 36 • Cleveland 15

Detroit 11 • Dallas 35 • Los Angeles 22

Printed in U.S.A.

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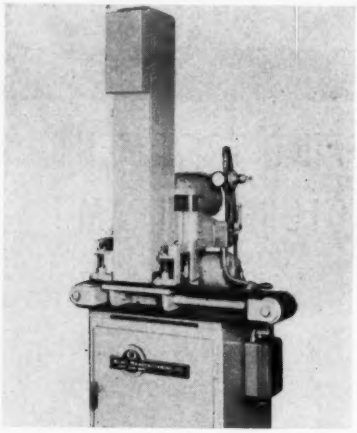


tiple head assemblies can be mounted in tandem along one long conveyor belt to perform high production, progressive finishing operations. The heads can also be mounted on a bench or used with rotary tables.

The abrasive belt is pneumatically tensioned. Other features include positive manual or automatic belt tracking, micrometer grind pressure adjustment, V-belt drive to permit abrasive belt speed changes, and infinitely variable control of conveyor belt feed.

For more information, *write* Acme Mfg. Co., 1400 E. Nine Mile Rd., Detroit 20, Mich.

Engine Lathe Models Have 36 Speeds, 75 hp

A HEAVY duty, high speed engine lathe is offered in three models with swings over the bed of 40½, 45½, and 49 in. It has antifriction bearings, automatic lubrication, and is powered by a 75 hp drive with no speedup gearing.

The headstock has 36 speeds in true geometric progression and automatic calculation of cutting speeds through a single dial control. The over-all speed ratio is 160:1. The headstock is capable of transmitting 75 hp in all speed ranges, says the company. End gearing is totally enclosed.

The gearbox design features a dual cam tumbler lock, 60 thread leads and feeds, and direct reading feed and thread plates. Apron design includes a fully enclosed worm drive and positive feed clutches (nonstick type).

Carriage and compound movements are controlled by individual three position, combination rapid traverse and feed levers. They can be actuated simultaneously. Rapid traverse and feed motions are protected by safety clutches.

For more information, *write* Sidney Machine Tool Co., subsidiary of Buhr Machine Tool Co., Sidney, Ohio.

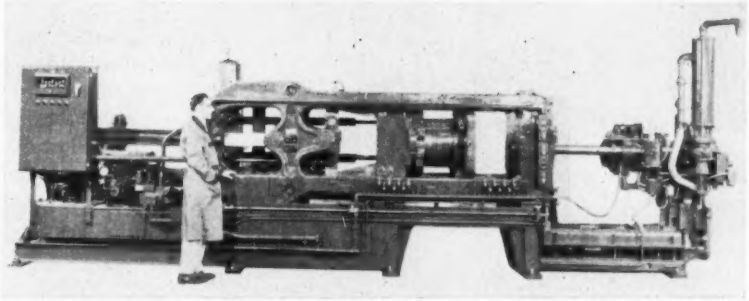
Batchboard Control Gives Preset Formula Advantages

THE Batchboard Remocon control outmodes manual adjustment of individual weight selectors to obtain the desired quantity of each ingredient in the batch.

Each Batchboard contains contact holes, each hole representing a weight value. Plug wires are inserted into the appropriate holes to set up the desired batch weight of each ingredient for single or multiple scales. An individual Batchboard is used for each formula. As many as 20 ingredients can be controlled by one Batchboard.

For more information, *write* Toledo Scale Div., Toledo Scale Corp., Toledo 12, Ohio.

Aluminum Diecaster Makes Long Parts



DEEP DRAW aluminum parts like rotors with long shafts, washing machine agitators, and automotive transmission housings weighing up to 16 lb can be produced on the HP-450X-SF diecasting machine.

The diecaster employs the Lester prefill injection system which provides high initial speed with high final impact, to provide superdense diecastings with fine surface finish. The prefill system is used with a nitrogen accumulator for highest initial shot speed.

The machine delivers 450 tons of clamping force while providing a die opening stroke which is adjustable from 8 to 30 in. The high preload clamping is made possible by the one piece alloy steel frame with its enormous beam area, equal to the full diameter of 7¼ in. tiebars. The solid-precision finished frame also insures permanent, parallel alignment of the platens.

Maximum die height is 30 in., adjustable to a minimum die height of 8 in., with total daylight of 60 in. The complete machine cycle

(*Please turn to Page* 114)

AMCHEM ALODINE

10 YEAR QUALITY RECORD OF ALODINE PRE-PAINT TREATMENT BACKED BY ALSCO MANAGEMENT-MANUFACTURING TEAM!

SPEAKING FOR MANAGEMENT

Ben Sugar, Alsco Vice-President Sales, on Alodine—"the foundation is the key to a successfully painted aluminum surface, and in the Alodine treatment, Alsco has found the best foundation in the industry. One of the major sales features we continually stress is Alsco's 'Six Bonds of Protection.' We consider Alodine one of the very important bonds that we use."

SPEAKING FOR MANUFACTURING

Dale Youssi, Alsco Plant Manager at Gnadenhutten, on Alodine—"Alsco has always used Alodine as a pre-paint treatment. We find the process extremely stable, the Amchem-designed electronic controls provide substantial labor savings for our quality control people, and Alodine has enabled us to speed up production rates while retaining uniform quality. The process is certainly paying for itself. For instance, improvements made in the process equipment during the last year have already been written off."

At Alsco's impressive manufacturing facility, Amchem Alodine has played and continues to play a vital role in maintaining the world-famous quality of Alsco products.

Using the new, improved Alodine 1200S pre-paint treatment for aluminum, Alsco is racking up traceable savings in time, labor and maintenance. The increased chemical activity of Alodine 1200S can reduce processing time as much as 50 per cent. In the last year, production line speeds have been increased by 15 per cent!

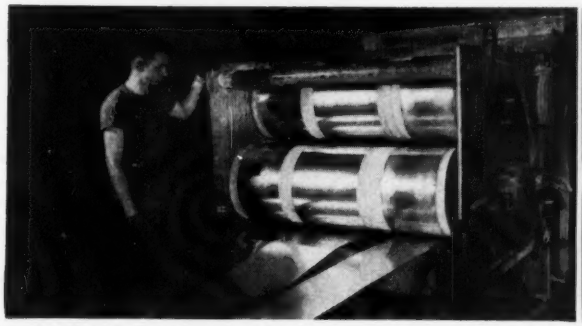
Alsco quality control personnel have acclaimed the installation of the fully automated (electronically) cleaner and coating stages on both their 3-strip and 2-strip lines. Alodine 1200S automation assures constant, uniform quality of the treated metal without constant operator attention to chemical bath maintenance.

Amchem technical assistance has been a major factor in sustaining Alsco's high quality within realistic cost structures. Continual improvements in the Alodine process have been instrumental in providing faster, better, more economical coating results!

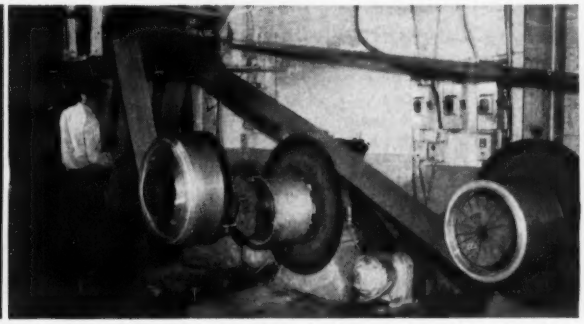
There's an Amchem Representative in your area with a pertinent story on how you can build a foundation of better quality on your aluminum products . . . with Alodine 1200S. Call our nearest representative, or write to Ambler, Pa., for complete technical details.

AT ALSCO

ALSCO QUALITY . . . FROM PRODUCTION TO PACKING

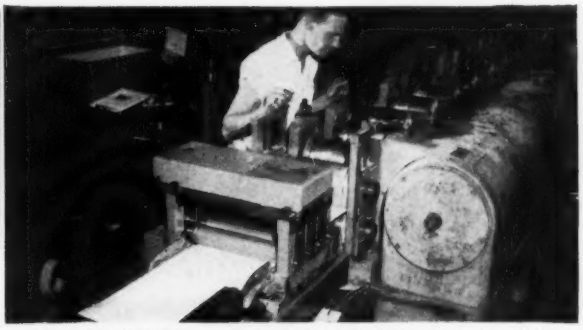


In the 3-strip metal preparation line, strip from aluminum coil is fed into Alodine processing baths where it is cleaned, rinsed, deoxidized, rinsed, coated with Alodine 1200S, rinsed, given a final acidulated rinse, then dried.

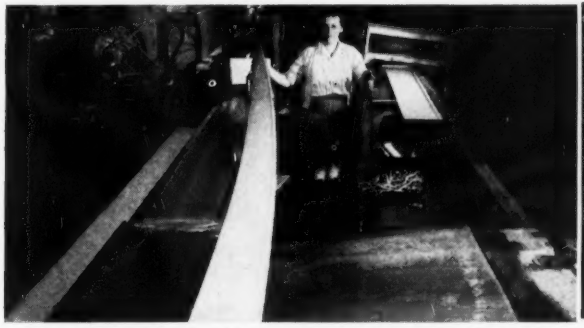


Emerging from the Alodine chemical bath treatment, aluminum strip is rewound prior to painting operation.

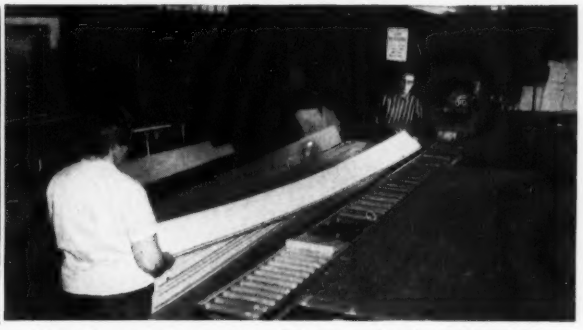
Alodized aluminum strip is roll-coat painted with Alsco's Gold Bak on one side and pastel and deeptone colors on the exterior surface.



After paint is bonded to metal in temperature controlled ovens, aluminum stock is roller formed into final shape for siding.



After forming, worker turns siding over to receive Styrofoam insulation backing. (Alsco was first siding manufacturer to Alodize both sides of strip)



Siding is inspected prior to packing and final shipment to Alsco dealers and distributors throughout the country.

AMCHEM

ALODINE 1200S

another chemical development of
AMCHEM PRODUCTS, INC., Ambler 27, Pa.
(Formerly American Chemical Paint Co.)

Detroit, Mich. • St. Joseph, Mo. • Niles, Calif. • Windsor, Ont. Amchem and Alodine are registered trademarks of Amchem Products, Inc.

(*Continued from Page* 114)

at the 8 in. die opening adjustment is 6.7 seconds, and at the 30 in. adjustment is only 8.5 seconds.

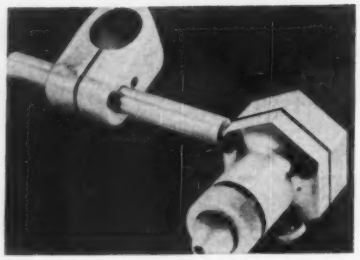
For more information, *write* Dept. N-2, Lester-Phoenix Inc., 2711 Church Ave., Cleveland 13, Ohio.

Drill Point Grinder Has Production Speed

HERE is a production grinder that is designed to take care of conventional, formed, or split points on a precision basis. All grinding is done wet. An integral pump is used.

A V-rest drill holder securely holds and positions each drill and eliminates loading, or adjustment of bushings, jaws, or collets.

Other features: A calibrated swivel fixture can grind conventional points with an included angle of 118 to 150 degrees. Provision is made to point drill sizes from 1/16



to ½ in. in diameter and up to 6 in. long.

Fixtures are available for angles less than 118 degrees and for extending drill length range to 12 in. The unit can be adapted for split pointing and helicentric pointing at production rates.

For more information, *write* Morse Twist Drill & Machine Co., New Bedford, Mass.

Elevators, Distributors Adjustable to Part Sizes

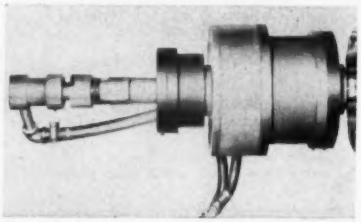
SINGLE and dual lift parts elevators and distributors are intended for automatic part handling installations (gravity flow). Single lift units can handle up to 5000 parts an hour in a single line, oriented flow. Dual models double the capacity.

Rolling or sliding parts can be accommodated. Input and discharge terminal heights are adjustable. Bolted construction permits reassembly to suit various part sizes.

For more information, *write* F. Jos. Lamb Co., 5663 E. Nine Mile Rd., Detroit 34, Mich.

Nonrotating Actuator Open, Closes Collets

DEPENDABLE holding power for bar or chucking work is provided by a nonrotating collet actuator



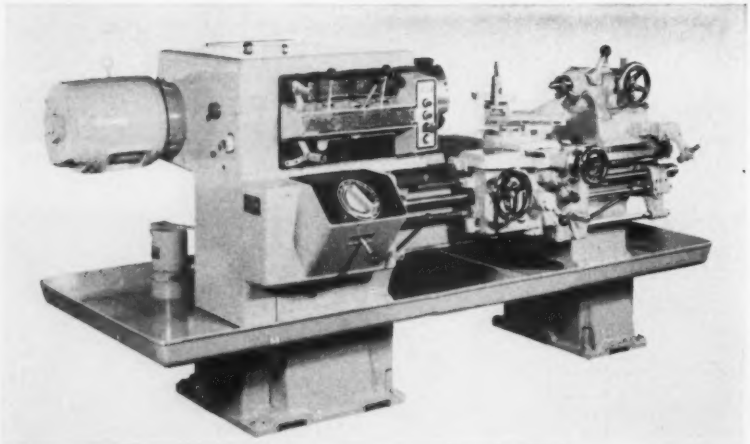
that automatically opens and closes chucks and collets.

The unit combines nonrotating design with long life. Instead of subjecting machine spindle guide bearings to both spindle loads and gripping loads, the collet clamping forces are transmitted through the actuator itself to eliminate substantial wear on the spindle bearings.

The actuator adapts to lathes, automatic screw machines, or machines up to 1½ in. bar capacity. Simply attached directly to the shaft of the machine, the unit requires no additional fixtures. The unit imposes no limit on spindles speeds, and minimizes downtime and maintenance.

For more information, *write* Acme Industrial Co., 200 N. Laflin, Chicago 7, Ill.

Lathe Redesign Improves Productivity



GREATER horsepower and increased speed range of the Series 2013 Clearing-Axelson lathe provide a high degree of precision on heavier cuts, and make it possible to machine many types of materials at optimum turning speeds.

A new gearbox enclosure snaps up the appearance of the machine as well as insuring better lubrication and the elimination of foreign materials in the gear train.

The machine also features hardened and ground headstock gears, bedways, and cross feed screws. The bedways are made of tool steel and are replaceable.

For more information, *write* Clearing Div., U. S. Industries Inc., 6499 W. 65th St., Chicago 38, Ill.

High Production Honer Compact, Easy to Operate

COMPACT design and simplicity of control are features of the Model 244 Barnes honing machine. The unit will hone bores from ½ to 6 in. in diameter.

An electric hone expansion unit

(*Please turn to Page* 118)

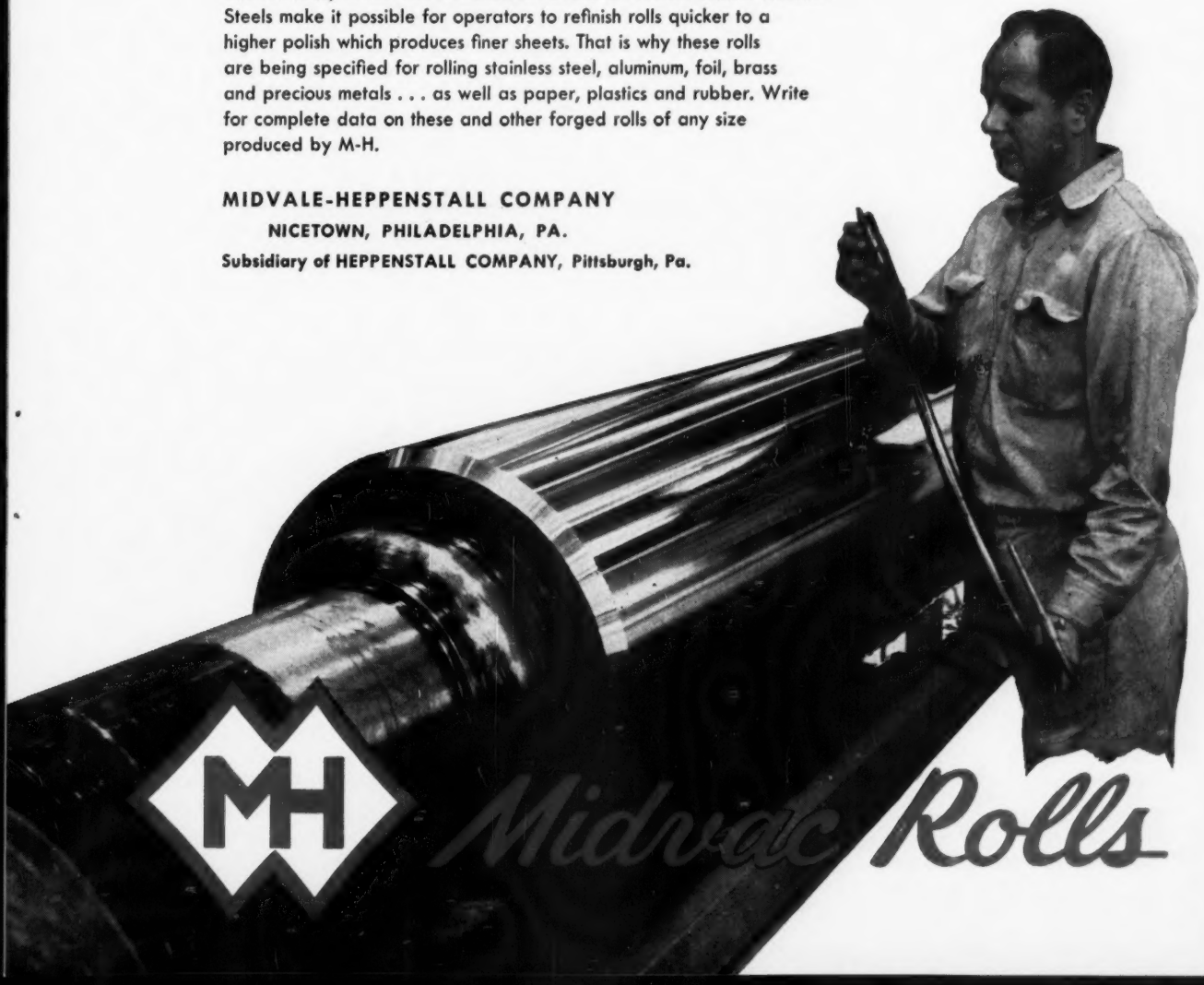
MIDVAC
Micro Lustre

VACUUM MELTED FINISHING ROLLS HAVE
CUT REGRINDING TIME IN HALF

The super uniformity of fine grain structure, maximum freedom of defects and non-metallic inclusions of Midvac Rolls have proved their value in mills from coast to coast. The Micro Lustre finish of these vacuum melted steel finishing rolls assures rolling surfaces free of imperfections . . . longer trouble-free service between grinds . . . and savings in refinishing time as much as 50%.

Midvac Rolls, made with consumable electrode vacuum melted Midvac Steels make it possible for operators to refinish rolls quicker to a higher polish which produces finer sheets. That is why these rolls are being specified for rolling stainless steel, aluminum, foil, brass and precious metals . . . as well as paper, plastics and rubber. Write for complete data on these and other forged rolls of any size produced by M-H.

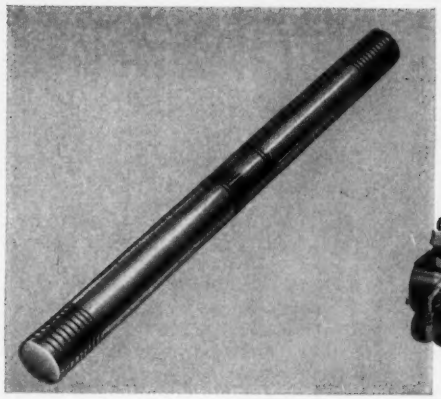
MIDVALE-HEPPENSTALL COMPANY
NICETOWN, PHILADELPHIA, PA.
Subsidiary of HEPPENSTALL COMPANY, Pittsburgh, Pa.



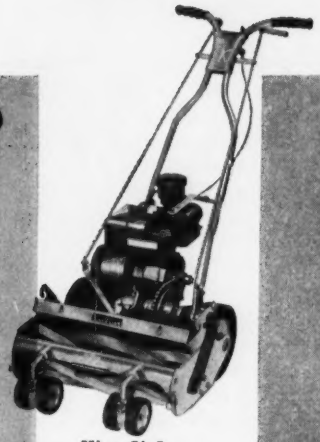
After a full year
of testing,
King O' Lawn* specifies
Fatigue-proof steel bars
for clutch shafts
..saves 25%!

Stressproof for shrub bars
..saves 30%!

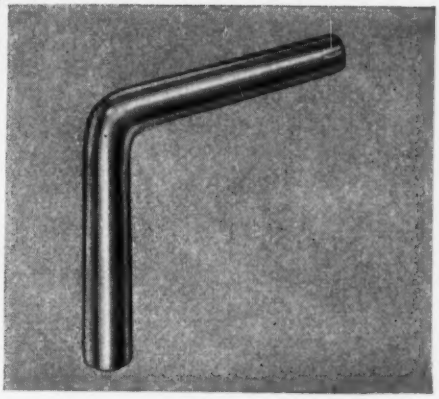
*King O' Lawn, Inc., South Gate, California, manufactures the nationally known King O' Lawn power mowers and power edgers



This patented clutch shaft is made of . . .



King O' Lawn
21" home power mower



This shrub bar is made of . . .

La Salle

fatigue-proof

STEEL BARS

MADE BY e.t.d. PROCESS

Elevated Temperature Drawing

FATIGUE-PROOF replaced leaded 4140, heat treated to Rockwell 34-35 C. Result: an over-all saving of 25%!

If you're making parts requiring strengths in the tensile range of 140,000 to 160,000 psi, you'll be interested in these cost-reducing advantages of LaSalle FATIGUE-PROOF:

No heat treating necessary . . . no cracks, warpage, or other problems associated with heat treating.

Faster machining . . . 25% faster than annealed alloys; 50% to 100% faster than heat treated alloys.

Exceptional uniformity from bar to bar, size to size, lot to lot.

PLUS excellent wearability, resistance to fatigue, and dimensional stability.

La Salle

STRESSPROOF

STEEL BARS

WITH COPPER

STRESSPROOF replaced C1045 and eliminated heat treating and related operations. Result: production costs reduced 30%.

If you're producing parts that call for minimum yield strengths of 100,000 psi, you'll want to know more about these important benefits of STRESSPROOF steel bars that will enable you to improve quality, cut production costs:

STRESSPROOF means high strength without heat treating . . . it replaces steels such as .40 carbon alloy, as well as other heat treated and alloy steels, such as 8640, 4140, C1045, C1141 and C1137.

Excellent machinability. STRESSPROOF machines at a 140 SFM average rate . . . or at 83% the speed of B1112.

Wearability without case hardening. STRESSPROOF often eliminates the need for case carburized or cyanide hardened steels . . . replacing steels such as C1117, C1118, C1016, C1018, 4615, and 8620.

La Salle STEEL CO.

1414 150th Street • Hammond, Indiana

Use this coupon to request technical bulletins describing LaSalle FATIGUE-PROOF steel bars . . . and LaSalle STRESSPROOF steel bars.

☐ Please send new bulletin, "Today's improved LaSalle STRESSPROOF Steel Bars with copper."

☐ Please send 24-page booklet, "A New Material," which presents the results of more than one year's test of production samples, and reports on eight application case studies.

Name_____

Title_____

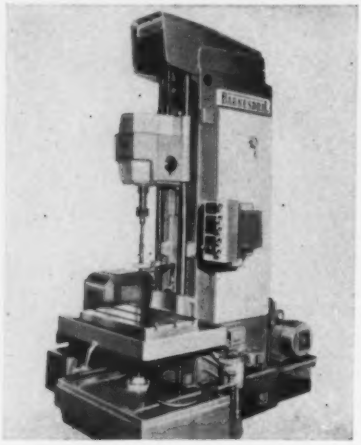
Company_____

Street_____

City_____ Zone____ State____

NEW PRODUCTS and equipment

(*Concluded from Page 114*)



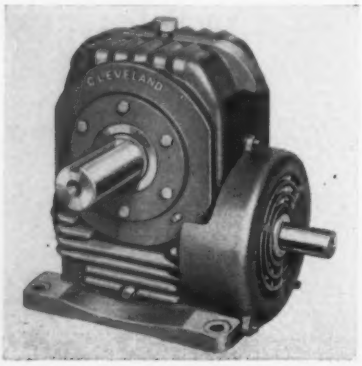
gives infinite hone feed adjustment without the tubes and rectifiers required in electronic controls. Rapid expansion, rapid collapse, and automatic compensation for stone wear are electrically controlled.

The machine is available with one or two spindles in a choice of three stroke lengths. The accurate reversal stroke permits short stroking at any point in the bore. The machine is particularly suited for honing ported bores. Fixturing is designed to suit specific production requirements.

For more information, *write* Barnes Drill Co., 854 Chestnut St., Rockford, Ill.

Worm Gear Speed Reducers Handle More Horsepower

UP TO 80 per cent more horsepower can be transmitted with a new line of worm gear speed reducers. Higher ratings are possible with fan cooling, centrifugally cast bronze gears, and special heat treating of alloy steel worms, says the manufacturer.



The fan is mounted on the input end of the wormshaft and is efficient in either direction of rotation.

Units with 4 in. worm gear centers and larger sizes have lifting ears cast into the upper portion of the housing.

Large gearshaft extension diameters permit an increased overhung load capacity.

An original master worm is in stock for each size and ratio of worm gearing. Hobs and production worms and gears are checked against the master to assure uniformity. The maker claims it is not necessary to replace worms and gears in sets.

For more information, *write* Cleveland Worm & Gear Co., subsidiary of Eaton Mfg. Co., 3300 E. 80th St., Cleveland 4, Ohio.

Pneumatic Sealer Easy to Operate

THIS PNEUMATIC sealer features a pistol grip for easy and convenient use on ¾ in. steel strapping. The operator sets the tool on the seal and pulls the trigger. Compressed air crimps the seal. It's suitable for cramped spaces or for hot coils where the operator can stand at arm's length from the heat.

The unit (Model RCNS) weighs 6 lb. It's available on an annual rental or single payment basis.

For more information, *write* Signode Steel Strapping Co., 2600 North Western Ave., Chicago 47, Ill.

NEW literature

Write directly to the company for a copy

Climatemakers' Data

Heating, cooling, ventilating, and filtering units are discussed in a catalog, No. AHV-59. Airfan Engineering Co., 7401 Telegraph Rd., Los Angeles 22, Calif.

Automatic Bar Machines

A 44 page catalog (MSB-59) describes a line of multiple spindle bar automatics. National Acme Co., 170 E. 131st St., Cleveland 8, Ohio.

Screw Thread Data

"Thread Tolerance Thief No. 1" provides charts that tell how much screw thread pitch diameter tolerance is consumed by increasing lengths of engagement. Advertising Dept., Box 579, Standard Pressed Steel Co., Jenkintown, Pa.

Liquid Pressure Nitriding

Bulletin 204 describes a liquid pressure nitriding process that produces an extremely hard case on nitrided steel parts. A. F. Holden Co., Detroit, Mich.

Centrifugal Castings Data

Information on the benefits offered by Sandusky centrifugal castings and how they have been used for the first time in many ways is given in a bulletin. Sandusky Foundry & Machine Co., Sandusky, Ohio.

Industrial Battery Manual

A 48 page general service manual details the operation, maintenance, charging, troubleshooting, and repair of motive power batteries. Advertising Dept., C & D Batteries Inc., Washington and Cherry Streets, Conshohocken, Pa.

Sand Conditioning Procedures

A catalog illustrates equipment available for sand processing. Beardsley & Piper, 2424 N. Cicero Ave., Chicago 39, Ill.

Advantages of Electric Trucks

The major features of construction and operating characteristics of battery powered industrial trucks are presented in an 18 page booklet. Electrical Industrial Truck & Allied Products Manufacturers, Suite 758, 1 Gateway Center, Pittsburgh 22, Pa.

Filter Materials

Catalog No. BFD-48 describes nine basic Bendix filter element materials for a wide variety of air, gas, and liquid filtering requirements. Typical applications are cited. Bendix Filter Div., Bendix Aviation Corp., 434 W. 12 Mile Rd., Madison Heights, Mich.

Conveyor Equipment

A 48 page catalog, No. A-101, contains detailed information on many types of package conveyor systems, including wheel, roller, and belt types. Photos show broad applications. Sage Equipment Co. Inc., 30 Essex St., Buffalo 13, N. Y.

The industry and Aetna's engineers work together in developing new ideas on seamless. Here is part of the new Aetna-built Seamless Mill of The Youngstown Sheet & Tube Co. at Indiana Harbor.

Seamless Pipe and Tube Mills

Most of the ideas about making seamless have been worked out between the producers and Aetna-Standard in their more than fifty years of association. Known as the "pipe mill people", Aetna has built most of the Seamless Mills in this country and around the world.

Aetna designs and builds several basic types of Seamless Mills. The Plug Mill or Two-High Rolling Mill is most generally used for the production of all sizes of seamless pipe and tubing. The Mandrel-Type Continuous Rolling Mill features high-volume production of small- and medium-sized tubing. The Assel Mill produces high-quality tubing to close tolerances, as required for anti-friction bearings and mechanical tubing.

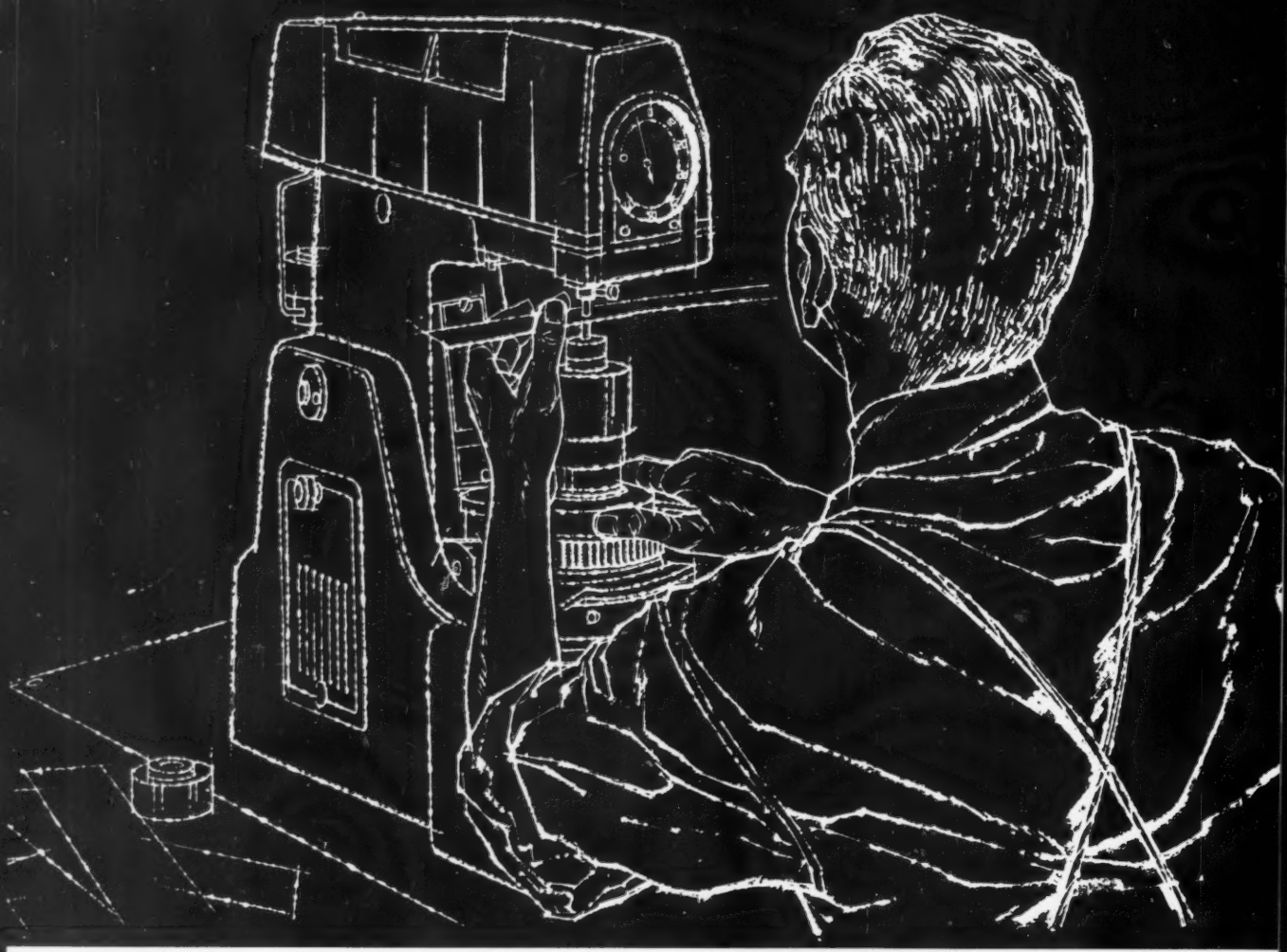
In combination with the basic Plug Mill or Mandrel Mill, Aetna builds the Stretch Reducing Mill. This unit has the advantage of economical production of small-sized tubing at maximum volume, while maintaining the high tonnage production of the basic Seamless Tube Mill. Another type—the Rotary Pipe Expander—produces pipe of larger diameters than can economically be produced on the Plug Mill.

BLAW-KNOX

BLAW-KNOX COMPANY

Aetna-Standard Division

Frick Bldg., Pittsburgh, Pa.



PRECISE HARDNESS CONTROL

to your specifications with

J&L Cold Rolled Strip Steels

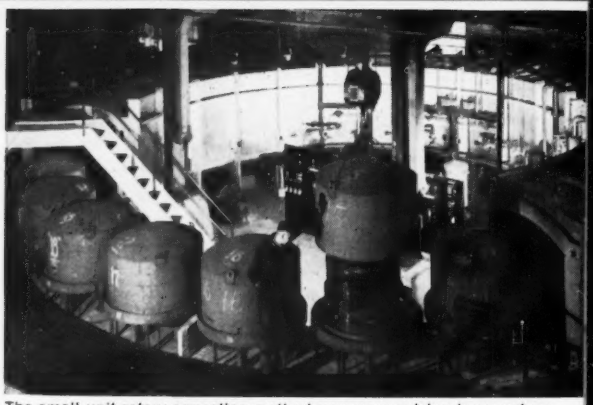
Variations within standard commercial limits of hardness for strip steels may not provide the quality needed for most critical applications.

At J&L the newest equipment and techniques are used to provide controlled hardness—to your specifications.

Basic oxygen converters, high standard open hearth practice and electric furnaces provide optimum melting conditions, new hot strip mills are specifically designed to produce the finishing temperatures needed for inherent quality. Cold mills, annealing and normalizing furnaces and other equipment are designed specifically for precision strip steel processing.

With an organization experienced in specialized strip steel processing, your most rigid specifications can be met consistently.

For your convenience, precision strip facilities are available to you in our plants at Youngstown, Indianapolis, Los Angeles and Kenilworth (N. J.)



The small unit rotary annealing method assures precision temperature control and develops optimum hardness and microstructure for high carbon, low carbon and alloy strip.

J&L

STRIP

LOW CARBON • HIGH CARBON • ALLOY • STAINLESS
TEMPERED SPRING STEEL • ZINC AND COPPER COATED

Jones & Laughlin Steel Corporation • STAINLESS and STRIP DIVISION • Youngstown 1, Ohio

September 21, 1959

Complaints Few as Users Back Industry

STEELMAKERS have the solid backing of most of their customers as they continue their fight for a noninflationary labor contract. Even though inventories are dangerously low in many industries, users are reaffirming their support of steel management's stand. They don't want peace at any price. Many would rather close their doors than see the industry grant wage concessions that could have the double-barreled effect of raising both their employment and raw material costs.

SHORTAGES SPREAD— Since the strike started, inventories have fallen from an all-time high of 26 million tons to a barely adequate 16 million. In another two weeks, they'll be at 14 million—close to minimum for the current level of economic activity. Small and medium size companies are feeling the pinch. First, they stretched their inventories by shutting down for vacations. Now, they're trying to substitute other sizes, grades, or gages for material they normally would use. Next, they'll curtail production and, finally, they'll close their doors.

BIG USERS NOT IMMUNE—Athough big consumers are better stocked than small ones (many can continue full production through October), some are already in trouble. Allis-Chalmers Mfg. Co. laid off 420 workers at its Springfield, Ill., plant, blaming steel shortages and a decline in road building. Caterpillar Tractor Co. is warning employees at its main plant in Peoria, Ill., that it may have to curtail operations after Sept. 25.

AUTOMAKERS WORRIED— Lack of steel for bumpers threatens to halt production of one of the Big Three's medium price cars. Aluminum may be substituted on a temporary basis, even though the user's previous attempts at drawing the light metal haven't been too successful. Stamping departments of a major truck builder are almost out of steel, but it's believed that finished part inventories are big enough to keep the company running well into October.

CONVERSION DEAL SET— More evidence of the automakers' concern with their inventories came to light when STEEL learned that Chrysler Corp. has contracted to take all of Lone Star Steel Co.'s surplus semifinished stock for 60 days. Chrysler will have the steel shipped to other mills for conversion to sheets or strip.

SHORTAGES AFTER STRIKE— Look for supply of these products to be tightest after the strike: Galvanized and cold rolled sheets; sheared plates, especially from 100 and 160 in. mills; wile flange beams; larger sizes of hot rolled bars (2⅝ to 6¼ in.), mainly in the Midwest; oil country goods (4½ to 5½ in. casing, 2⅜ and 2⅞ in. tubing, and "spaghetti"—the small stuff used in dual completion drilling).

SCRAP MARKET TIGHTENS— Continued strong export demand and anticipation of higher prices after the strike are strengthening the scrap market. Item: Japan has contracted for 81 cargoes for October-December shipment from the East Coast. About 750,000 tons are involved. Last week, STEEL's composite price on the No. 1 heavy melting grade went up $1 to $41 a ton.

PRODUCTION UP SLIGHTLY— Last week, steelmaking operations climbed half a point to 12.5 per cent of capacity. Production was about 355,000 ingot tons.

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*Current prices were published in the Sept. 14 issue and will appear in subsequent issues.

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RAYETTE INCORPORATED

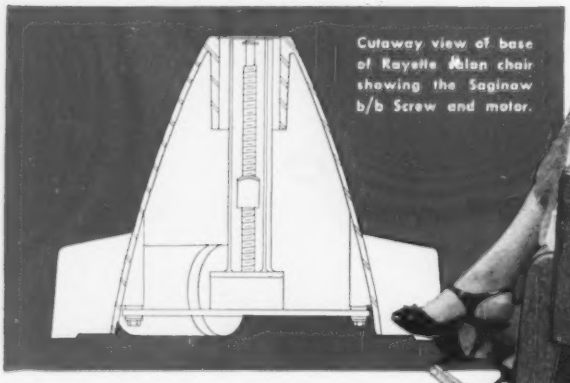
TRIMS SIZE OF SALON CHAIR

with the SAGINAW b/b SCREW!

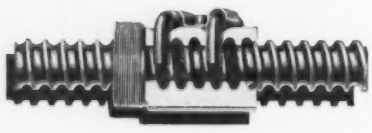
"Space is at a premium in most beauty salons, so we had to build a chair that was both compact and trouble-free to answer our customers' needs. The Saginaw Ball Bearing Screw helped us do both. It gives us better than 95% operating efficiency, and also allows us to use a smaller, more economical motor to reduce the chair's size. Because of the Saginaw Screw's dependability, we've found our servicing costs cut to a minimum," *says Sam E. Goodman, V.P. of Marketing, Rayette, Inc., St. Paul, Minnesota.*

Yes, the Saginaw Ball Bearing Screw converts *rotary* motion into *linear* motion with over 90% efficiency. Scores of manufacturers have saved time, power, weight, space and cost by switching to these versatile Saginaw Screws.

Perhaps the Saginaw Screw can give *your* products that greater Sales Appeal you're looking for. Interested in details? They're yours simply by writing or telephoning Saginaw Steering Gear Division, General Motors Corporation, Saginaw, Michigan— *world's largest producers of b/b screws and splines.*



Cutaway view of base of Rayette salon chair showing the Saginaw b/b Screw and motor.



Give your products NEW SALES APPEAL... switch to the Saginaw ball bearing Screw

WORLD'S MOST EFFICIENT ACTUATION DEVICE

Investment Casters Widen Markets

INVESTMENT CASTERS have at least two good reasons to be enthusiastic over their 1959 business: 1. Sales are expected to reach $85 million for the industry, up 6.2 per cent from last year's. 2. Their products are gaining wider commercial acceptance as they become less dependent on defense spending.

Although confirmed statistics aren't available, the Investment Casting Institute estimates that for some time (up until this year) blade and vane sales to the aircraft-missile-space propulsion industry (blades and vanes comprise one segment, aircraft structures another) accounted for 60 per cent of investment casters' volume. On that basis, blade and vane business was figured at $48 million, other applications $32 million, in breaking down 1958's sales of $80 million.

A breakdown of sales for applications other than blades and vanes shows this distribution: Other aircraft uses, 41 per cent or $13.12 million; government nonaircraft, 17 per cent or $5.24 million; commercial applications, 42 per cent or $13.44 million.

This year, however, aircraft-missile-space propulsion categories have fallen off while commercial applications have shown steady growth. The castings go into such products as firearms, hand tools, sewing machines, prosthetic surgery devices, business machines, farm machinery, electronic and electrical equipment, canning and shoe machinery, garbage disposers.

Today's investment castings may range in weight from a fraction of an ounce to 100 lb or more. These were made by Precision Metalsmiths Inc.

• Sales for applications other than blades and vanes in the first seven months of this year are 30 per cent above the same period of 1958, says the ICI.

If the percentage gain holds throughout the year, sales in that portion of the market will rise to about $41.6 million. ICI estimates that blade and vane sales this year will aggregate about 10 per cent below 1958's.

On that basis, sales in that segment of the industry will total $43.2 million.

The institute estimates the industry's annual sales as follows:

1959	$85 million
1958	80 million
1957	104 million
1956	115 million
1955	102 million
1954	86 million
1953	80 million

The industry believes that its commercial markets will expand even faster in the next few years as the attributes of investment casting become better known. It reports that more designers are incorporating the castings into products with special requirements for alloys, shapes, or quantities which could not be made economically by other methods. The castings will be at home, for example, in new commercial jet airliners, an aircraft industry which should grow although military aircraft programs decline.

• Although the industry suffers from overcompetition, prices have been driven up by rising costs.

Some producers, however, complain that many of the small shops don't have accurate ideas of their true costs and are pricing their castings below their worth compared with competitive forming processes.

Ceramic shell type molds and

vacuum melting, two comparatively recent technical developments, are gaining acceptance. The ceramic shell mold is used for large, high quality castings produced from wax patterns rather than plastics. Vacuum melting is in limited use, largely for high temperature aluminum and titanium alloys.

Future developments in the field are expected to produce automation of ceramic shell casting, larger castings produced under closer control, and alloys with improved physical properties. The weight range of investment castings has widened considerably in recent years. Today, some weigh only a fraction of an ounce, others 100 lb or more.

Steel Imports in July Top Exports by Big Margin

Steel imports rose in July, establishing a monthly record, reports the U. S. Department of Commerce. Exports declined. It was the eighth straight month in which imports exceeded exports—so far this year they have been about twice as heavy as exports.

Imports totaled 430,000 net tons in July, bringing the seven month total to 2.3 million tons vs. 1.7 million in all of 1958. In the peak year (1951), 2.2 million were imported.

The principal source is Belgium-Luxembourg, which supplies about 40 per cent of the total. Japan, West Germany, and France furnish about 15 percent each. Lesser tonnages are coming from the United Kingdom, Canada, and other countries.

Principal products tonnagewise are concrete reinforcing bars, structural shapes, pipe and tubing, other bar and bar-size shapes, and wire rods. Imports of barbed wire during the first half were equal to 51 per cent of the total supply. Other import ratios: Wire nails, 35 per cent of supply; concrete reinforcing bars and wire fencing, 26 per cent each; wire rods, 22 per cent. Imports of all products represented 4 per cent of the total supply.

About 40 per cent of imports enter by way of Atlantic Coast ports, 30 to 35 per cent through Gulf ports, about 15 per cent through West Coast ports.

Exports of steel products dropped to 161,000 tons in July, bringing the total for the first seven months of the year to only 1.2 million tons, equivalent to a little over 2 per cent of industry shipments. In the comparable period of 1958 the total was 1.7 million tons. Exports in 1958, when world demand for steel was down, dropped to only 2.7 million tons from 5.2 million in 1957. The excess of imports over exports in the first seven months this year was 1.1 million tons, and a continuation of the trend could make 1959 the first year in which U. S. steel exports are exceeded by imports. The monthly trend of U. S. foreign trade in steel mill products, 1958-59, in thousands of net tons, is shown by this table:

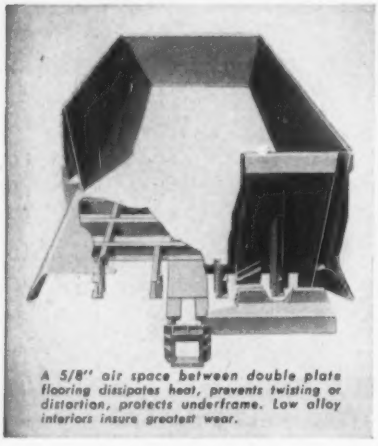
STEEL FOREIGN TRADE
(Thousands of net tons)

	1958		1959	
	Imports	Exports	Imports	Exports
January	71	326	229	161
February	68	242	241	168
March	92	264	287	178
April	114	267	360	178
May	118	244	385	166
June	126	163	411	191
July	171	169	430	161
August	157	171	...	...
September	180	181	...	...
October	201	251	...	...
November	175	239	...	...
December	230	170	...	...
7 Month Total	760	1,675	2,343	1,203
Year Total	1,703	2,687	...	...

Data from U. S. Bureau of Census, Department of Commerce.

MAGOR AIR DUMP CARS

FOR STEEL PLANT SERVICE



A 5/8" air space between double plate flooring dissipates heat, prevents twisting or distortion, protects underframe. Low alloy interiors insure greatest wear.

The new Magor Air Dump Car for steel plant service can cut your refuse disposal costs as much as 40%! Safe, swift, automatic dumping eliminates expensive labor and crane equipment. Low height and open type body means faster loading. Saves time, labor and haulage costs! Smooth interiors eliminate "dead load" returns!

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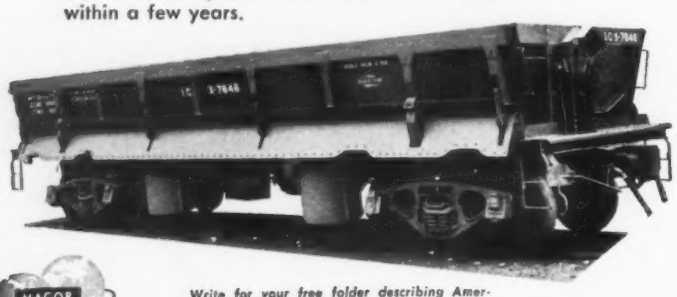

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West Coast Steel Imports Are Below Expectations

The inflow of foreign steel into the West Coast area has increased since the start of the steel strike but at a much slower rate than had been expected. July imports were about 10 per cent above June's.

The smaller-than-expected gain is attributed to: 1. U. S. consumers' inventories have been heavy. 2. Foreign mills, operating close to capacity before the U. S. industry's shutdown, have not been in position to expand their output.

But if the steel strike continues much longer, a sharp rise in imports (and their prices) is anticipated. Demand is expected to be strong after the U. S. industry resumes production.

Steel Shortages Are Beginning to Be Felt

Instances of depleted steel inventories are becoming more numerous. Caterpillar Tractor Co. told employees at its main plant in Peoria, Ill., that shortages may force curtailment of operations. It was first thought, the company said, that shortages of some steels would mean reduced operations after Sept. 18, but schedule adjustments and purchases of new steel should allow the plant to continue in full operation until Sept. 25.

However, the company letter went on, continuation of operations beyond Sept. 18 means "we will be consuming our stock of raw materials to such an extent that it increases the possibility of curtailment even after the strike is settled."

Allis-Chalmers Mfg. Co. laid off 420 employees in its Springfield, Ill., tractor plant Sept. 11, blaming the steel situation and a decline in road building. The company denies knowledge of any future planned layoffs.

In general, steel consumers are not yet pressing steelmakers to get the strike over. When pinned down, many explain they have enough steel in inventory to keep operations going for a month or two. They admit they may run out of some special items and hope that they can pick up what they need at warehouses.

The big concern of most consumers is that they won't get prompt deliveries of steel after the strike ends. By that time, shortages may be so general that steel service centers won't be able to accommodate all customers.

Steel Supplies Tighten In Southwest Markets

Steel executives in the Southwest have not yet received many consumer inquiries on the strike situation. Little if any direct pressure is being generated for a settlement of the dispute. Warehouse operators, running shy of items not rolled by foreign mills, have been the most frequent callers.

Although few consumers have suffered yet because of the strike, supply of some items is tight. With U. S. oil drilling operations far ahead of last year, some shortages are cropping up on that front. Drill stem pipe and wellhead casing shortages are beginning to worry the industry. Also, critical shortages within two weeks are being predicted in galvanized and black sheets, light sections, and floor

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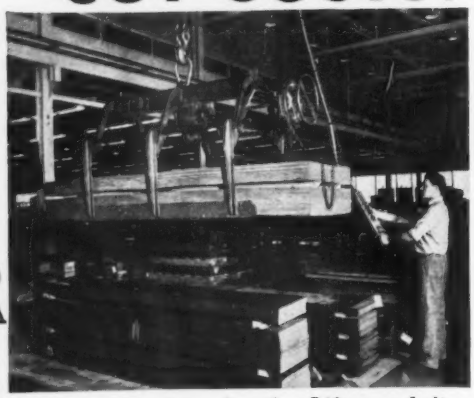

The A. B. Dick Company, Niles, Illinois, found that this C-F Lifter has substantially reduced man hours and crane time required to move stock in and out of storage.

Up to 10,000 lbs. of high grade sheets in varying widths may be picked up, carried and unloaded at shears or machines with speed and economy by the Lifter and its operator.

C-F Lifters are made in standard or semi-special models to handle from 2 to 60 tons. Bulletin SL-30 describes the advantages you can obtain from C-F Lifters. Write for it today.

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plates—items not available from overseas mills.

No major price changes have been posted on foreign steel products recently in the Houston area. Most price increases came within two weeks after the strike. As one example of how the law of supply and demand has worked during the strike, imported nails were quickly priced at just 15 cents a keg under domestic nails. Prior to the strike, foreign nails were $2.50 a keg below U. S. prices.

Sheets, Strip . . .

Sheet & Strip Prices, Pages 134 & 135

While sheet steel consumers are concerned over immediate supply to fill gaps in their inventories, they are also showing quickening interest in getting tonnage orders on mill books for first quarter shipment. One large producer says that most of his customers are more worried about getting supplies than they are over immediate stocks.

It's realized that producers' books are choked with tonnage for delivery over the remainder of this year, even if operations are resumed at once. That is the case especially on hot and cold rolled sheets and galvanized sheets. Supply of those is most stringent at present. Some mills say they have at least four months' business in hand; in some grades, they have more than that.

Some stamping shops are running low on sheets, and demand on the service centers for galvanized and cold rolled sheets is mounting steadily. The few mills still in operation are gradually extending their deliveries, and in some cases are behind on earlier promises.

Slit sheet volume, which has cut heavily into cold rolled strip in recent years, has tapered off.

The large users of sheets are still in fairly comfortable supply position, but here and there signs are increasing of smaller plants starting to run short of certain items. Big plants probably have enough steel on hand to carry them through October, but the smaller manufacturers may have to scramble to get in tonnage before then. That means increasing demand on the service centers is likely over the next couple of weeks.

Shipments of steel shipping barrels and drums in June totaled 3,841,-

526 units, up 11 per cent from May and 44 per cent from June, 1958, reports the Bureau of the Census. An increase is also shown in the total for the first half of the year—18,437,428 units vs. 15,369,023 in the like 1958 period.

The movement of steel pails in June comprised 9,162,686 units, up 12 per cent from May and 36 per cent from June a year ago. Shipments in the first six months this year were 42,228,816 units vs. 35,-124,774 in the like period last year.

Prices Reduced by Carmet On Drill, Machine Bits

Carmet, the carbide producing facility of Allegheny Ludlum Steel Corp., Pittsburgh, last week announced price reductions on its mining tools, effective immediately. Prices on drill bits have been reduced 20 per cent in 500 quantities and 25 per cent in 1500 quantities. Prices on machine bits are reduced 4 per cent on 5000 quantities, and 10 per cent on 10,000 quantities. Headquarters of the Carmet Div. are at 1500 Jarvis St. (Ferndale), Detroit, Mich.

Tool Steel . . .

Tool Steel Prices, Page 139

Revised figures on tool steel shipments in July were issued last week by the American Iron & Steel Institute showing the total for the month was 6662 net tons, whereas the original report placed the month's total at 8013 tons.

Shipments in the first seven months of this year amounted to 62,949 tons vs. 38,063 in the like period of last year.

Stainless Steel . . .

Stainless Steel Prices, Page 139

New orders for stainless steel are coming in at a higher rate as users chew up their inventories. Few consumers are in immediate danger, but many are anxious to get orders on mill books to assure themselves of early deliveries after the strike.

Even though several producers are operating, they're in no position to meet the requirements of users whose other sources of supply have been choked off.

The struck companies say it's hard to assess how much business

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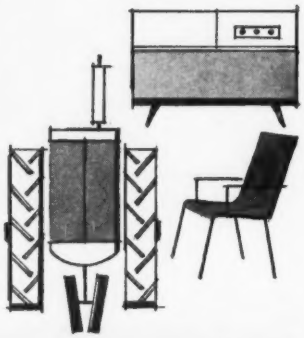
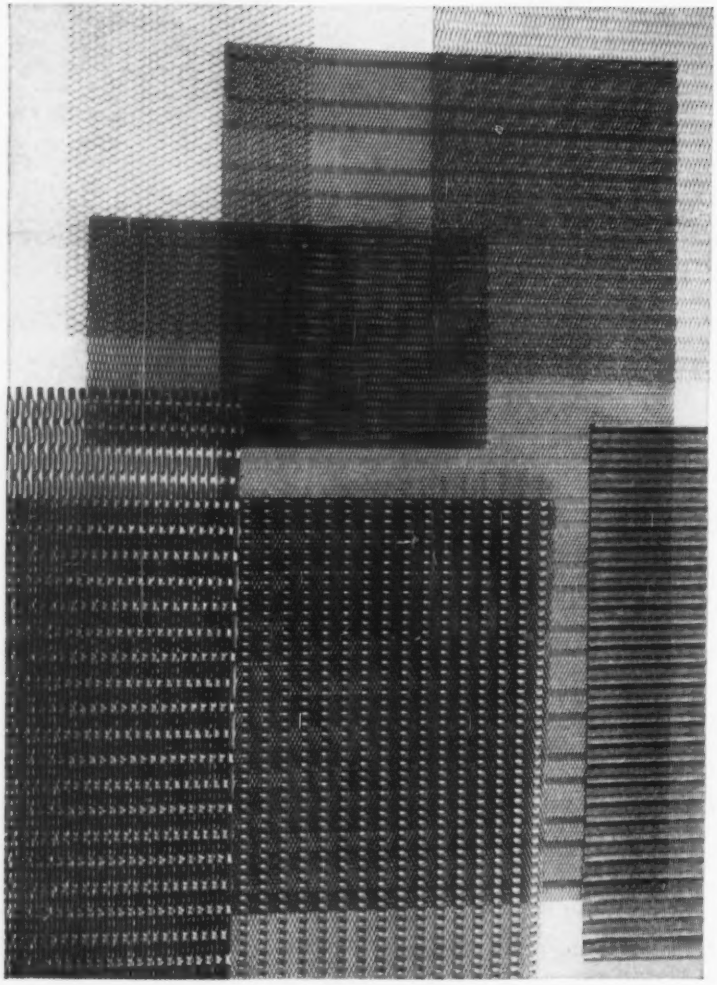


product: EXPANDED METAL



problem:

the production of expanded metal panels for a wide variety of products ranging from automobiles to air conditioners, tractors to phonographs, stoves to patio furniture, television receivers and lawn mowers. These to be fabricated from decorator designs in an almost limitless range of complexity. Equipment, created specifically for the purpose, functions at highest efficiency and economy with coil steel which is cut and expanded. The often enormous stretch of quite narrow strands could cause breakage and rejection of the entire piece.

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Cold Rolled Sheets

they're losing to competition. Some accounts will be lost for a long time, they concede, because the operating mills will do everything in their power to make a good impression.

Throughout the industry backlogs are so large that capacity operations are assured for the balance of the year and well into 1960.

Steel Bars . . .

Bar Prices, Page 133

Although most consumers of cold finished bars are running short on certain grades and sizes, they have enough steel on hand to continue full production for two or three weeks.

Cold drawers are booked two or three months ahead. They can't estimate how soon after the strike they'll resume capacity operations because they can't tell when the hot mills will start shipping them bars or what kind of mix they'll receive in the first shipments.

Barring equipment breakdowns, the cold mills should be in high gear a week after operations are resumed. Since cold drawers had almost exhausted their semifinished inventories when the strike started, they're hoping that the hot mills will have billets ready for processing or rolled steel ready for inspection when operations are resumed.

After the strike, it's expected that all sizes of bars within certain grades will be in tight supply.

Wire . . .

Wire Prices, Pages 135 & 136

Users of wire products are placing forward orders in slightly heavier volume for scheduling after mills resume production.

Rods are likely to be a bottleneck in supplies when the strike is ended. Many wire mills and converters, notably in New England, are dependent on affiliated companies for rod supplies, and tonnage required for drawn wire will have to compete with other steel products for a share of ingot production. This applies to the three largest mills idled by the strike and will filter through to numerous finished products, including wire rope and springs.

Some screw manufacturers are issuing new price lists, incorporating advances. Screw order volume has been substantial, but profit margins are narrow.

Tin Plate . . .

Tin Plate Prices, Page 135

While tin plate consumers are well fixed for supplies and may get through the steel strike without too much difficulty, they are pressing the mills with orders for first quarter and beyond delivery.

Some buyers are trying to get about three-quarters of next year's requirements on mill books for rolling during the first half.

Distributors . . .

Prices, Page 140

Distributors of steel products are anticipating a spurt in orders as gaps are developing in consumers' inventories. In general, service centers hold adequate stocks to care for their regular customers, but a few sellers are running out of certain items. In the Pacific Northwest and Southwest, for example, galvanized sheets are in short supply.

With consumers turning to the service centers on a larger scale, warehouse stocks may be quickly depleted if the strike drags on much longer. In any event, it's certain the distributors will take care of their regular trade first.

In the Southwest, a spokesmen for the service centers says the absence of panic buying underscores the fact that users were well prepared for the mill shutdown. Also, the area was an established dumping ground for foreign steel long before the strike, which has served to increase the traffic in imports.

While some foreign steel is coming into Great Lakes ports, tonnages are relatively light. There has been little American buying of Canadian steel during the strike.

Pig Iron . . .

Pig Iron Prices, Page 140

Merchant pig iron continues to move to foundries in fairly impressive volume. Many casting shops have stepped up their operations since Labor Day, notably those serving the automotive industry.

No shortage of pig iron is reported yet, but over-all supplies are getting tighter. With the mills using a high ratio of their own pig iron in the fourth quarter, supplies available for the merchant market may be less plentiful than they have been for a long time.

Operators of merchant furnaces anticipate strong demand well into next year. It's estimated that blast furnaces operating on extended labor contracts have been pouring around 200,000 tons of iron weekly.

Tubular Goods . . .

Tubular Goods Prices, Page 139

Buttweld pipemakers will be able to ship any requirement within 30 days of the strike's end, they say. In seamless pipe, most deliveries will be made within 60 days. Hardest to get will be the 2 to 4 in. sizes. Some items will be available in less than two weeks.

The outlook for oil country goods is clouded. Producers won't know what kind of deliveries they can promise until they tot up carryovers from July and determine how much they must set aside for downriver terminals. September and October orders won't be shipped before December.

Sales executives are warning users to order at once if they hope to get anything before the end of the year. When production resumes, orders will be processed by month of acceptance and entry date. Hardest to get after the strike will be 4½ to 5½ in. casing, 2⅜ and 2⅞ in. tubing, and "spaghetti," the small stuff (1¼, 1½, and 2-1/16 in. OD) used in dual completion drilling programs.

Users' inventories of oil country goods are still in pretty good shape. Distributors are trying to take care of their regular customers, the independent drillers, even when it

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means refusing to sell to some major oil producers.

Hughes Tool Co. reports a 25-rig weekly gain in the number of wells drilled in the week ended Sept. 7. The total was 2132 rigs at work, 60 more than a year ago. With drilling far ahead of last year some steel shortages are cropping up. Drill stem pipe and wellhead casing shortages are worrying the industry.

Cast iron pipe sales agencies in the Pacific Northwest report several sizable tonnages of pipe were placed recently. Seattle, Tacoma, and Spokane purchased heavily, and other cities in the area are actively in the market. Some business from Alaska is in prospect.

August Steel Production Is Smallest Since 1949

Steel production declined to 1,438,000 net tons in August, smallest monthly output since October, 1949, reports the American Iron & Steel Institute. In July, output was 5,227,129 net tons, and in August a year ago it was 7,308,003 tons.

Output during the first eight months of this year was 70,943,332 tons vs. 51,502,895 in the like period of 1958. The 1959 period featured three prestrike months with more than 11 million tons output each and one month with nearly 11 million tons.

The institute's index of steelmaking shows August output was 20.2 in terms of the basic index of average production in 1947-49. Comparisons: 73.5 during July and 102.7 in August last year.

The index figure for the first eight months this year was 127.2 vs. 92.4 in the same period of last year.

Based on the Jan. 1 capacity rating (147,633,670 net tons annually) steelmaking operations averaged 11.5 per cent of capacity in August vs. 41.7 in July. For the first eight months operations averaged 72.2 per cent.

Steel Ingot Production—August, 1959

Period	OPEN HEARTH (Net tons)	BESSEMER (Net tons)	OXYGEN PROCESS (Net tons)	ELECTRIC (Net tons)	TOTAL (Net tons)	Per cent of capacity
1959						
January ...	8,280,985	120,005	186,820	729,575	9,317,385	74.3
February ..	8,541,031	128,515	176,970	756,422	9,602,938	84.8
March	10,216,474	184,892	236,595	929,784	11,567,745	92.3
1st. Qtr. ..	27,038,490	433,412	600,385	2,415,781	30,488,068	83.8
April	9,884,322	195,730	237,018	964,850	11,281,920	93.0
May	10,117,968	200,887	257,325	1,024,401	11,600,581	92.5
June	9,521,053	185,794	259,731	941,056	10,907,634	89.9
2nd Qtr. ..	29,523,343	582,411	754,074	2,930,307	33,790,135	91.8
1st 6 Mo..	56,561,833	1,015,823	1,354,459	5,346,088	64,278,203	87.8
†July	4,540,182	66,433	94,489	526,025	5,227,129	41.7
†August ...	1,169,000	.....	.....	269,000	1,438,000	11.5

Period	—OPEN HEARTH— Net tons	Per cent of capacity	——BESSEMER—— Net tons	Per cent of capacity	——ELECTRIC—— Net tons	Per cent of capacity	———TOTAL——— Net tons	Per cent of capacity
1958								
January ..	6,085,124	58.6	121,338	35.5	547,440	44.8	6,753,912	56.5
February .	5,252,112	56.0	81,597	26.4	448,614	40.6	5,782,323	53.6
March	5,598,944	53.9	122,317	35.8	533,361	43.6	6,254,622	52.3
1st Qtr. ..	16,936,180	56.2	325,252	32.8	1,529,425	43.1	18,790,857	54.1
April	4,875,619	48.5	109,433	33.1	547,939	46.3	5,532,991	47.8
May	5,602,123	53.9	110,366	32.3	588,670	48.2	6,301,159	52.7
June	6,378,942	63.4	88,125	26.6	660,413	55.8	7,127,480	61.6
2nd Qtr. ..	16,856,684	55.3	307,924	30.7	1,797,022	50.1	18,961,630	54.0
1st 6 Mo...	33,792,864	55.7	633,176	31.7	3,326,447	46.6	37,752,487	54.1
July	5,712,587	55.0	114,218	33.4	615,600	50.4	6,442,405	53.9
August ...	6,481,185	62.4	134,435	39.3	692,383	56.6	7,308,003	61.1
September..	6,769,660	67.3	103,194	31.2	759,518	64.2	7,632,372	66.0
3rd Qtr. ..	18,963,432	61.5	351,847	34.7	2,067,501	57.0	21,382,780	60.3
9 Mo.	52,756,296	57.7	985,023	32.7	5,393,948	50.1	59,135,267	56.2
October ...	7,795,541	75.0	148,458	43.4	895,779	73.3	8,839,778	74.0
November..	7,572,555	75.3	145,867	44.1	850,896	71.9	8,596,318	74.1
December .	7,755,002	74.6	116,637	34.1	838,883	68.6	8,710,522	72.9
4th Qtr. ..	23,123,098	75.0	410,962	40.5	2,585,558	71.3	26,119,618	73.6
2nd 6 Mo..	42,086,530	68.3	762,809	37.6	4,653,059	64.1	47,502,398	67.0
Total	75,879,394	62.0	1,395,985	34.7	7,979,506	55.4	85,254,885	60.6

Note—The percentages are based on annual capacities as of Jan. 1, 1959: Open hearth, 126,528,380 net tons; bessemer, 3,577,000 net tons; basic oxygen process, 4,033,160 net tons; electric and crucible, 13,495,130 net tons. Total: 147,633,670 net tons. In 1958, the capacity tonnages were: Open hearth, 122,321,830 net tons; bessemer, 4,027,000 net tons; oxygen process, electric and crucible, 14,393,740 net tons. Total: 140,742,570 net tons.
*Revised. †Preliminary.

DISTRICT INGOT RATES

(Percentage of Capacity Engaged)

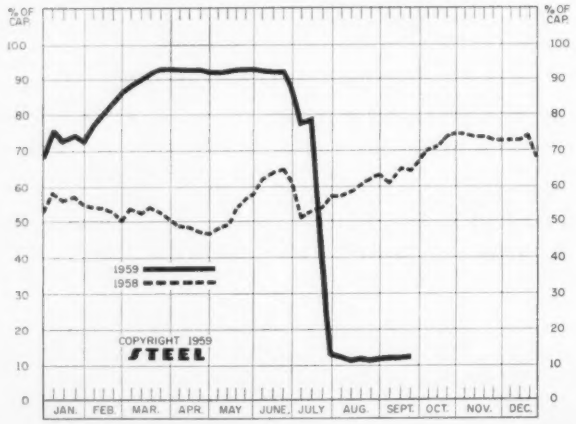
	Week Ended Sept. 20	Change	Same Week 1958	Same Week 1957
Pittsburgh	2	0	61	81
Chicago	5.5	0*	76.5	83.5
Eastern	10	0	64	87
Youngstown	9	0	59	79
Wheeling	48	+ 0.5	69.5	93.5
Cleveland	6	0	57.5	87.5
Buffalo	4	0	53.5	100
Birmingham	9	+ 1.5	54	76.5
Cincinnati	70.5	— 0.5*	73.5	82
St. Louis	58	0	78	83
Detroit	24.5	+ 1	67.5	95
Western	6	0	74	95
National Rate ..	12.5	+ 0.5	66.5	81

INGOT PRODUCTION

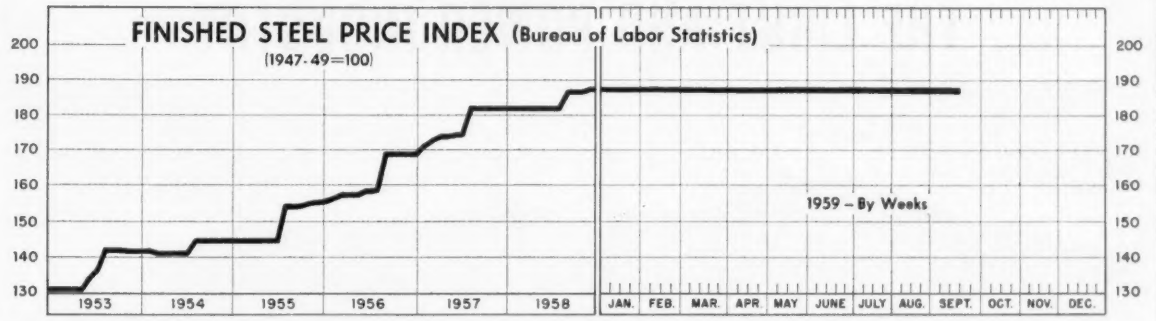
	Week Ended Sept. 20	Week Ago	Month Ago	Year Ago
INDEX ..... (1947-49=100)	21.5	20.4	20.0	110.2
NET TONS .... (In thousands)	345	327	321	1,771

*Change from preceding week's revised rate.
†Estimated by STEEL; comparative figures reported by AISI.
Weekly capacity (net tons): 2,831,331 in 1959; 2,699,173 in 1958; 2,559,490 in 1957.

NATIONAL STEELWORKS OPERATIONS



Price Indexes and Composites



Sept. 15, 1959	Week Ago	Month Ago	Aug. Index	Year Ago
186.7	186.7	186.7	186.7	186.6

AVERAGE PRICES OF STEEL (Bureau of Labor Statistics)

Week Ended Sept. 15

Prices include mill base prices and typical extras and deductions. Units are 100 lb except where otherwise noted in parentheses. For complete description of the following products and extras and deductions applicable to them, write to STEEL.

Rails, Standard No. 1	$5.825	Bars, Reinforcing	6.385
Rails, Light, 40 lb	7.292	Bars, C.F., Carbon	10.710
Tie Plates	6.875	Bars, C.F., Alloy	14.125
Axles, Railway	10.175	Bars, C.F., Stainless, 302 (lb)	0.570
Wheels, Freight Car, 33 in. (per wheel)	62.000	Sheets, H.R., Carbon	6.350
Plates, Carbon	6.350	Sheets, C.R., Carbon	7.300
Structural Shapes	6.167	Sheets, Galvanized	8.615
Bars, Tool Steel, Carbon (lb)	0.560	Sheets, C.R., Stainless, 302 (lb)	0.658
Bars, Tool Steel, Alloy, Oil Hardening Die (lb)	0.680	Sheets, Electrical	12.625
Bars, Tool Steel, H.R. Alloy, High Speed, W 6.75, Cr 4 5, V 2.1, Mo 5.5, C 0.060 (lb)	1.400	Strip, C.R., Carbon	9.489
Bars, Tool Steel, H.R. Alloy, High Speed, W18, Cr 4, V 1 (lb)	1.895	Strip, C.R., Stainless, 430 (lb)	0.480
Bars, H.R., Alloy	10.775	Strip, H.R., Carbon	6.250
Bars, H.R., Stainless, 303 (lb)	0.543	Pipe, Black, Buttweld (100 ft)	19.905
Bars, H.R., Carbon	6.675	Pipe, Galv., Buttweld (100 ft)	23.253
		Pipe, Line (100 ft)	199.533
		Casing, Oil Well, Carbon (100 ft)	201.080
		Casing, Oil Well, Alloy (100 ft)	315.213
Tubes, Boiler (100 ft)	51.200	Black Plate, Canmaking Quality (95 lb base box)	7.900
Tubing, Mechanical, Carbon (100 ft)	27.005	Wire, Drawn, Carbon	10.575
Tubing, Mechanical, Stainless, 304 (100 ft)	205.608	Wire, Drawn, Stainless, 430 (lb)	0.665
Tin Plate, Hot-dipped, 1.25 lb (95 lb base box)	10.100	Bale Ties (bundles)	7.967
Tin Plate, Electrolytic, 0.25 lb (95 lb base box)	8.800	Nails, Wire, 8d Common	9.825
		Wire, Barbed (80-rod spool)	8.722
		Woven Wire Fence (20-rod roll)	21.737

STEEL's FINISHED STEEL PRICE INDEX*

	Sept. 16 1959	Week Ago	Month Ago	Year Ago	5 Yr Ago
Index (1935-39 avg=100)	247.82	247.82	247.82	246.65	194.19
Index in cents per lb	6.713	6.713	6.713	6.682	5.261

STEEL's ARITHMETICAL COMPOSITES*

Finished Steel, NT	$149.96	$149.96	$149.96	$149.28	$117.77
No. 2 Fdry, Pig Iron, GT	66.49	66.49	66.49	66.49	56.54
Basic Pig Iron, GT	65.99	65.99	65.99	65.99	56.04
Malleable Pig Iron, GT	67.27	67.27	67.27	67.27	57.27
Steelmaking Scrap, GT	41.00	40.00	38.33	43.00	29.75

*For explanation of weighted index see STEEL, Sept. 19, 1949, p. 54; of arithmetical price composite, STEEL, Sept. 1, 1952, p. 130.

Comparison of Prices

Comparative prices by districts in cents per pound except as otherwise noted. Delivered prices based on nearest production point.

FINISHED STEEL	Sept. 16 1959	Week Ago	Month Ago	Year Ago	5 Yr Ago
Bars, H.R., Pittsburgh	5.675	5.675	5.675	5.675	4.30
Bars, H.R., Chicago	5.675	5.675	5.675	5.675	4.30
Bars, H.R., deld., Philadelphia	5 975	5.975	5.975	5.975	4.55
Bars, C.R., Pittsburgh	7.65*	7.65*	7.65*	7.65*	5.40
Shapes, Std., Pittsburgh	5.50	5.50	5.50	5.50	4.25
Shapes, Std., Chicago	5 50	5.50	5.50	5.50	4.26
Shapes, deld., Philadelphia	5.77	5.77	5.77	5.77	4.53
Plates, Pittsburgh	5.30	5.30	5.30	5.30	4.225
Plates, Chicago	5.30	5.30	5.30	5.30	4.225
Plates, Coatesville, Pa.	5.30	5.30	5.30	5.30	4.225
Plates, Sparrows Point, Md.	5.30	5.30	5.30	5.30	4.225
Plates, Claymont, Del.	5.30	5.30	5.30	5.30	4.225
Sheets, H.R., Pittsburgh	5.10	5.10	5.10	5.10	4.05
Sheets, H.R., Chicago	5.10	5.10	5.10	5.10	4.05
Sheets, C.R., Pittsburgh	6.275	6.275	6.275	6.275	4.95
Sheets, C.R., Chicago	6.275	6.275	6.275	6.275	4.95
Sheets, C.R., Detroit	6.275	6.275	6.275	6.275	5.10
Sheets, Galv., Pittsburgh	6.875	6.875	6.875	6.875	5.45
Strip, H.R., Pittsburgh	5.10	5.10	5.10	5.10	4.05
Strip, H.R., Chicago	5.10	5.10	5.10	5.10	4.05
Strip, C.R., Pittsburgh	7.425	7.425	7.425	7.425	5.75
Strip, C.R., Chicago	7.425	7.425	7.425	7.425	6.00
Strip, C.R., Detroit	7.425	7.425	7.425	7.425	5.60-5.90
Wire, Basic, Pittsburgh	8.00	8.00	8.00	8.00	5.75
Nails, Wire, Pittsburgh	8.95	8.95	8.95	8.95	6.85
Tin plate (1.50 lb) box, Pitts.	$10.65	$10.65	$10.65	$10.30	$8.95

*Including 0.35c for special quality.

SEMIFINISHED STEEL					
Billets, forging, Pitts. (NT)	$99.50	$99.50	$99.50	$99.50	$78.00
Wire rods, ⅜-⅝" Pitts.	6.40	6.40	6.40	6.40	4.675

PIG IRON, Gross Ton	Sept. 16 1959	Week Ago	Month Ago	Year Ago	5 Yr Ago
Bessemer, Pittsburgh	$67.00	$67.00	$67.00	$67.00	$57.00
Basic, Valley	66.00	66.00	66.00	66.00	56.00
Basic, deld., Philadelphia	70.41	70.41	70.41	70.41	49.66
No. 2 Fdry, Neville Island, Pa.	66.50	66.50	66.50	66.50	56.50
No. 2 Fdry, Chicago	66.50	66.50	66.50	66.50	56.50
No. 2 Fdry, deld., Phila.	70.91	70.91	70.91	70.91	50.16
No. 2 Fdry, Birmingham	62.50	62.50	62.50	62.50	52.88
No. 2 Fdry (Birm.) deld., Cin.	70.20	70.20	70.20	70.20	60.43
Malleable, Valley	66.50	66.50	66.50	66.50	56.50
Malleable, Chicago	66.50	66.50	66.50	66.50	56.50
Ferromanganese, net ton†	245.00	245.00	245.00	245.00	190.00

†74-76% Mn, Duquesne, Pa.

SCRAP, Gross Ton (Including broker's commission)					
No. 1 Heavy Melt, Pittsburgh	$41.50	$38.50	$38.50	$43.50	$30.50
No. 1 Heavy Melt, E. Pa.	41.00	41.00	40.00	40.00	28.75
No. 1 Heavy Melt, Chicago	40.50	40.50	36.50	45.50	30.00
No. 1 Heavy Melt, Valley	41.50	41.50	41.50	43.50	32.50
No. 1 Heavy Melt, Cleve.	38.50	38.50	38.50	40.00	28.50
No. 1 Heavy Melt, Buffalo	33.50	33.50	33.50	34.50	26.50
Rails, Rerolling, Chicago	62.50	62.50	61.50	65.50	44.50
No. 1 Cast, Chicago	55.50	55.50	53.50	46.50	35.50

COKE, Net Ton					
Beehive, Furn., Connlsvl.	$15.00	$15.00	$15.00	$15.25	$14.75
Beehive, Fdry., Connlsvl.	18.25	18.25	18.25	18.25	16.75
Oven, Fdry., Milwaukee	32.00	32.00	32.00	30.50	25.25

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—and its employees who buy Savings Bonds and strengthen America's Peace Power

Every time we flip on a light or enjoy the comfort of a home appliance, we can thank the electric light and power industry for making this convenience possible. Hundreds of thousands of our fellow Americans are proud of their work in the generation and distribution of electricity for our homes and our industries.

There's another great service to our country's welfare of which these people are justly proud, too. For they are adding to America's Peace Power through the purchase of U. S. Savings Bonds on the Payroll Savings Plan. By regular purchase of Shares in America these thrifty people are reinforcing their own security and establishing current reserves for home-building, education and travel.

If your company already has the Payroll Savings Plan, make sure that every employee is actively encouraged to join. If you don't yet have the Plan, maybe now's the time to install it. For information and help, contact your State Savings Bonds Director. Or write to: Savings Bonds Division, U. S. Treasury Dept., Washington, D. C.

Shown here is Arno Paegel, at work with one of the great electric light and power companies of this country. Like so many thousands of his fellow craftsmen, Mr. Paegel is making regular use of his company Payroll Savings Plan to contribute to the Peace Power of America.

STEEL
The Metalworking Weekly

THE U. S. GOVERNMENT DOES NOT PAY FOR THIS ADVERTISEMENT. THE TREASURY DEPARTMENT THANKS, FOR THEIR PATRIOTISM, THE ADVERTISING COUNCIL AND THE DONOR ABOVE.

Steel Prices

Mill prices as reported to STEEL, Sept. 16, cents per pound except as otherwise noted. *Changes shown in italics.* Code number following mill point indicates producing company. Key to producers, page 134; footnotes, page 136.

SEMIFINISHED

INGOTS, Carbon, Forging (NT)
Munhall,Pa. U5 ....$76.00

INGOTS, Alloy (NT)
Detroit S41 ....$82.00
Economy,Pa. B14 ....82.00
Farrell,Pa. S3 ....82.00
Lowellville,O. S3 ....82.00
Midland,Pa. C18 ....82.00
Munhall,Pa. U5 ....82.00
Sharon,Pa. S3 ....82.00

BILLETS, BLOOMS & SLABS Carbon, Rerolling (NT)
Bartonville,Ill. K4 ...$82.00
Bessemer,Pa. U5 ....80.00
Buffalo R2 ....80.00
Clairton,Pa. U5 ....80.00
Ensley,Ala. T2 ....80.00
Fairfield,Ala. T2 ....80.00
Fontana,Calif. K1 ....90 50
Gary,Ind. U5 ....80 00
Johnstown,Pa. B2 ....80.00
Lackawanna,N.Y. B2 ..80.00
Munhall Pa. U5 ....80.00
Owensboro,Ky. G8 ....80.00
S.Chicago Ill. R2 U5 ..80.00
S Duquesne,Pa. U5 ..80.00
Sterling,Ill. N15 ....80.00
Youngstown R2 ....80.00

Carbon, Forging (NT)
Bessemer,Pa. U5 ....$99.50
Buffalo R2 ....99.50
Canton,O R2 ....102.00
Clairton,Pa. U5 ....99 50
Conshohocken,Pa. A3..104.50
Ensley,Ala. T2 ....99 50
Fairfield,Ala. T2 ....99 50
Farrell Pa. S3 ....99.50
Fontana,Calif. K1 ...109 00
Gary,Ind. U5 ....99 50
Geneva,Utah C11 ....99.50
Houston S5 ....104.50
Johnstown,Pa. B2 ....99 50
Lackawanna N.Y. B2..99.50
LosAngeles B3 ....109 00
Midland Pa. C18 ....99 50
Munhall Pa. U5 ....99.50
Owensboro,Ky. G8 ....99 50
Seattle B3 ....109 00
Sharon,Pa. S3 ....99.50
S.Chicago R2, U5, W14..99.50
S Duquesne,Pa. U5 ..99.50
S.SanFrancisco B3 ...109.00
Warren,O. C17 ....99.50

Alloy, Forging (NT)
Bethlehem,Pa. B2 ..$119.00
Bridgeport,Conn. C32..119.00
Buffalo R2 ....119.00
Canton,O R2, T7 ....119.00
Conshohocken,Pa. A3..126.00
Detroit S41 ....119.00
Economy,Pa. B14 ....119.00
Farrell,Pa. S3 ....119.00
Fontana,Calif. K1 ...140 00
Gary Ind. U5 ....119.00
Houston S5 ....124.00
Ind.Harbor,Ind. Y1 ..119.00
Johnstown Pa. B2 ....119 00
Lackawanna N.Y. B2..119.00
LosAngeles B3 ....139 00
Lowellville,O. S3 ....119.00
Massillon,O R2 ....119 00
Midland,Pa. C18 ....119.00
Munhall,Pa. U5 ....119.00
Owensboro,Ky. G8 ...119 00
Sharon,Pa. S3 ....119 00
S.Chicago R2,U5,W14 .119.00
S.Duquesne,Pa. U5 ...119 00
Struthers O. Y1 ....119.00
Warren,O. C17 ....119.00

ROUNDS, SEAMLESS TUBE (NT)
Buffalo R2 ....$122.50
Canton,O. R2 ....125.00
Cleveland R2 ....122.50
Gary,Ind. U5 ....122.50
S Chicago Ill. R2, W14 122.50
S.Duquesne,Pa. U5 ...122.50
Warren,O. C17 ....122.50

SKELP
Aliquippa,Pa. J5 ....5.05
Munhall,Pa. U5 ....5.05
Pittsburgh J5 ....5.05
Warren,O. R2 ....5.05
Youngstown R2, U5 ....5.05

WIRE RODS
AlabamaCity,Ala. R2 ..6.40
Aliquippa,Pa. J5 ....6 40
Alton,Ill. L1 ....6 60
Bartonville,Ill. K4 ....6.50
Buffalo W12 ....6.40
Cleveland A7 ....6 40
Donora,Pa. A7 ....6.40
Fairfield,Ala. T2 ....6.40
Houston S5 ....6.65
IndianaHarbor,Ind. Y1..6.40
Johnstown,Pa. B2 ....6.40
Joliet,Ill. A7 ....6.40
KansasCity,Mo. S5 ....6.65
Kokomo Ind. C16 ....6.50
LosAngeles B3 ....7.20
Minnequa,Colo. C10 ....6.65
Monessen,Pa. P7 ....6.40
Pittsburg,Calif. C11 ....7.20
Portsmouth,O. P12 ....6.40
Roebling,N.J. R5 ....6.50
S Chicago,Ill. R2, W14..6 40
SparrowsPoint,Md. B2 ..6.50
Sterling,Ill.(1) N15 ....6.40
Sterling,Ill. N15 ....6.50
Struthers,O. Y1 ....6 40
Worcester,Mass. A7 ....6.70

STRUCTURALS

Carbon Steel Std. Shapes
AlabamaCity,Ala. R2 ..5.50
Aliquippa,Pa. J5 ....5.50
Atlanta A11 ....5 70
Bessemer,Ala. T2 ....5 50
Bethlehem,Pa. B2 ....5.55
Birmingham C15 ....5.60
Clairton Pa. U5 ....5.50
Fairfield,Ala. T2 ....5.50
Fontana,Calif. K1 ....6.30
Gary,Ind U5 ....5.50
Geneva,Utah C11 ....5 50
Houston S5 ....5.60
Ind.Harbor,Ind. I-2, Y1..5 50
Johnstown,Pa. B2 ....5 55
Joliet,Ill. P22 ....5.50
KansasCity,Mo. S5 ....5.60
Lackawanna,N Y. B2 ..5 55
LosAngeles B3 ....6.20
Minnequa,Colo. C10 ....5 80
Munhall Pa. U5 ....5.50
Niles,Calif. P1 ....6 25
Phoenixville,Pa. P4 ....5.55
Portland,Oreg. O4 ....6.25
Seattle B3 ....6.25
S.Chicago,Ill. U5 W14..5.50
S SanFrancisco B3 ....6.15
Sterling Ill. N15 ....5 50
Torrance Calif. C11 ....6 20
Weirton,W.Va. W6 ....5.50

Wide Flange
Bethlehem,Pa. B2 ....5.55
Clairton,Pa. U5 ....5.50
Fontana,Calif. K1 ....6 45
IndianaHarbor,Ind. I-2..5.50
Lackawanna,N Y. B2 ..5 55
Munhall Pa. U5 ....5 80
Phoenixville,Pa. P4 ....5 55
S Chicago,Ill. U5 ....5.50
Sterling Ill. N15 ....5.50
Weirton,W.Va. W16 ....5.50

Alloy Std. Shapes
Aliquippa,Pa. J5 ....6.80
Clairton,Pa. U5 ....6 80
Gary Ind. U5 ....6 80
Houston S5 ....6 90
Munhall,Pa U5 ....6 80
S.Chicago,Ill. U5, W14..6.80

H.S., L.A., Std. Shapes
Aliquippa,Pa. J5 ....8.05
Bessemer,Ala. T2 ....8.05
Bethlehem,Pa. B2 ....8 10
Clairton,Pa. U5 ....8 05
Fairfield,Ala. T2 ....8 05
Fontana,Calif. K1 ....8.85
Gary,Ind. U5 ....8 05
Geneva,Utah C11 ....8 05
Houston S5 ....8.15
Ind.Harbor,Ind. I-2, Y1..8.05
Johnstown,Pa. B2 ....8.10
KansasCity,Mo. S5 ....8.15
Lackawanna,N Y. B2 ..8 10
LosAngeles B3 ....8.75
Munhall Pa. U5 ....8 05
Seattle B3 ....8.80
S.Chicago,Ill. U5, W14..8.05
S.SanFrancisco B3 ....8.70
Sterling Ill. N15 ....7 75
Struthers,O. Y1 ....8.05

H.S., L.A., Wide Flange
Bethlehem,Pa. B2 ....8.10
Ind.Harbor,Ind I-2 ....8 05
Lackawanna,N Y. B2 ..8 10
Munhall,Pa. U5 ....8.05
S.Chicago,Ill. U5 ....8.05
Sterling,Ill. N15 ....7.75

PILING

BEARING PILES
Bethlehem,Pa. B2 ....5.55
Ind.Harbor Ind. I-2 ....5 50
Lackawanna,N Y. B2 ..5 55
Munhall,Pa. U5 ....5.50
S.Chicago,Ill. I-2, U5 ..5.50

STEEL SHEET PILING
Ind.Harbor Ind. I-2 ....6.50
Lackawanna,N.Y. B2 ..6.50
Munhall,Pa. U5 ....6.50
S.Chicago,Ill. I-2, U5 ..6.50
Weirton,W.Va. W6 ....6.50

PLATES

PLATES, Carbon Steel
AlabamaCity,Ala. R2 ..5.30
Aliquippa,Pa. J5 ....5.30
Ashland,Ky.(15) A10 ...5.30
Atlanta A11 ....5.50
Bessemer,Ala. T2 ....5.30
Clairton,Pa. U5 ....5 30
Claymont,Del. C22 ....5 30
Cleveland J5, R2 ....5.30
Coatesville,Pa. L7 ....5.30
Conshohocken,Pa. A3 ..5.30
Ecorse,Mich. G5 ....5.30
Fairfield,Ala. T2 ....5.30
Farrell Pa. S3 ....5.30
Fontana,Calif.(30) K1 ..6.10
Gary,Ind. U5 ....5.30
Geneva,Utah C11 ....5.30
GraniteCity Ill. G4 ....5.40
Harrisburg,Pa. P4 ....5.30
Houston S5 ....5.40
Ind Harbor,Ind. I-2, Y1 5.30
Johnstown,Pa. B2 ....5.30
Lackawanna,N Y. B2 ..5 30
Mansfield,O. E6 ....5.30
Minnequa,Colo C10 ....6 15
Munhall,Pa. U5 ....5.30
Newport,Ky. A2 ....5.30
Pittsburgh J5 ....5.30
Riverdale,Ill. A1 ....5.30
Seattle B3 ....6 20
Sharon,Pa. S3 ....5.30
S.Chicago,Ill. U5 W14..5 30
SparrowsPoint,Md. B2 ..5.30
Sterling,Ill N15 ....5 30
Steubenville,O. W10 ....5 30
Warren O. R2 ....5.30
Youngstown U5, Y1 ....5 30
Youngstown(27) R2 ....5.30

PLATES, Carbon Ahras. Resist.
Claymont,Del. C22 ....7.05
Fontana,Calif. K1 ....7 85
Geneva,Utah C11 ....7.05
Houston S5 ....7.15
Johnstown,Pa. B2 ....7.05
SparrowsPoint,Md. B2 ..7.05

PLATES, Wrought Iron
Economy,Pa. B14 ....13.55

PLATES, H.S., L.A.
Aliquippa,Pa. J5 ....7.95
Ashland,Ky. A10 ....7 95
Bessemer Ala. T2 ....7 95
Clairton Pa. U5 ....7.95
Claymont,Del. C22 ....7.95
Cleveland J5, R2 ....7 95
Coatesville,Pa. L7 ....7.95
Conshohocken,Pa. A3 ..7.95
Economy Pa. B14 ....7 95
Ecorse,Mich. G5 ....7 95
Fairfield,Ala. T2 ....7.95
Farrell,Pa. S3 ....7.95
Fontana,Calif (30) K1 ..8.75
Gary,Ind. U5 ....7 95
Geneva,Utah C11 ....7.95
Houston S5 ....8.05
Ind Harbor,Ind. I-2, Y1..7 95
Johnstown,Pa B2 ....7.95
Munhall,Pa. U5 ....7.95
Pittsburgh J5 ....7.95
Seattle B3 ....8.85
Sharon Pa. S3 ....7 95
S.Chicago Ill. U5, W14..7.95
SparrowsPoint,Md. B2 ..7 95
Warren,O. R2 ....7.95
Youngstown U5, Y1 ....7.95

PLATES, Alloy
Aliquippa,Pa. J5 ....7.50
Claymont,Del. C22 ....7 50
Coatesville,Pa. L7 ....7.50
Economy Pa. B14 ....7.50
Farrell,Pa. S3 ....7.50
Fontana,Calif. K1 ....8.30
Gary,Ind. U5 ....7.50
Houston S5 ....7.60
Ind Harbor,Ind. Y1 ....7.50
Johnstown,Pa. B2 ....7.50
Lowellville,O. S3 ....7.50
Munhall Pa. U5 ....7 50
Newport Ky. A2 ....7.50
Pittsburgh J5 ....7.50
Seattle B3 ....8.40
Sharon,Pa. S3 ....7.50
S Chicago Ill. U5, W14..7.50
SparrowsPoint Md. B2 ..7.50
Youngstown Y1 ....7.50

FLOOR PLATES
Cleveland J5 ....6.375
Conshohocken,Pa. A3 ..6 375
Ind Harbor,Ind. I-2 ..6.375
Munhall,Pa. U5 ....6 375
Pittsburgh J5 ....6.375
S.Chicago,Ill. U5 ....6.375

PLATES, Ingot Iron
Ashland c.l.(15) A10 ..5.55
Ashland l.c.l.(15) A10 ..6 05
Cleveland c.l. R2 ....6 05
Warren,O. c.l. R2 ....6.05

BARS

BARS, Hot-Rolled Carbon (Merchant Quality)
Ala.City,Ala.(9) R2 ..5.675
Aliquippa,Pa.(9) J5 ..5 675
Alton,Ill. L1 ....5.875
Atlanta(9) A11 ....5.875
Bessemer,Ala.(9) T2 ..5.675
Birmingham(9) C15 ..5.675
Buffalo(9) R2 ....5.675
Canton,O (23) R2 ....6.15
Clairton Pa.(9) U5 ....5.675
Cleveland(9) R2 ....5 675
Ecorse,Mich.(9) G5 ....5.675
Emeryville,Calif. J7 ..6 425
Fairfield,Ala.(9) T2 ..5 675
Fairless,Pa.(9) U5 ....5.825
Fontana Calif.(9) K1 ..6 375
Gary,Ind.(9) U5 ....5.675
Houston(9) S5 ....5.925
Ind Harbor(9) I-2, Y1..5.675
Johnstown,Pa.(9) B2 ..5 675
Joliet Ill. P22 ....5.675
KansasCity,Mo.(9) S5..5.925
Lackawanna(9) B2 ...5 675
LosAngeles(9) B3 ....6.375
Massillon O (23) R2 ...6 15
Midland Pa.(23) C18 ..6.025
Milton,Pa. M18 ....5.825
Minnequa,Colo. C10 ..6 125
Niles,Calif. P1 ....6 375
Owensboro,Ky.(9) G8 ..6 025
Pittsburg Calif.(9) C11..6 375
Pittsburgh(9) J5 ....5.675
Portland Oreg O4 ....6 425
Riverdale,Ill.(9) A1 ..5 675
Seattle A24, B3, N14 ..6.425
S.Ch'e'go(9)R2 U5,W14 5 675
S.Duquesne,Pa.(9) U5..5.675
S SanFran..Calif.(9)B3 6 425
Sterling,Ill.(1)(9) N15..5 675
Sterling,Ill (9) N15 ...5.775
Struthers O (9) Y1 ....5 675
Tonawanda N Y. B12 ..5 675
Torrance,Calif.(9) C11..6.375
Warren,O. C17 ....6.025
Youngstown(9) R2, U5..5.675

Bars, Hot-Rolled Alloy
Aliquippa,Pa. J5 ....6.725
Bethlehem Pa. B2 ....6 725
Bridgeport Conn. C32 ..6 80
Buffalo R2 ....6.725
Canton,O R2 T7 ....6 725
Clairton,Pa. U5 ....6 725
Detroit S41 ....6 725
Economy Pa. B14 ....6 725
Ecorse Mich. G5 ....6.725
Fairless,Pa. U5 ....6.875
Farrell,Pa. S3 ....6 725
Fontana,Calif. K1 ....7 775
Gary,Ind. U5 ....6 725
Houston S5 ....6.975
Ind Harbor Ind. I-2, Y1 6 725
Johnstown,Pa. B2 ....6.725
KansasCity,Mo. S5 ....6.975
Lackawanna,N Y. B2 ..6 725
LosAngeles B3 ....7.775
Lowellville,O. S3 ....6 725
Massillon O. R2 ....6 725
Midland Pa C18 ....6 725
Owensboro,Ky. G8 ....6.725
Pittsburgh J5 ....6.725
Sharon,Pa. S3 ....6.725
S Chicago R2, U5, W14..6 725
S Duquesne,Pa. U5 ....6.725
Struthers,O. Y1 ....6 725
Warren,O. C17 ....6 725
Youngstown U5 ....6.725

BARS & SMALL SHAPES, H.R. High-Strength, Low-Alloy
Aliquippa,Pa. J5 ....8 30
Bessemer,Ala. T2 ....8.30
Bethlehem Pa. B2 ....8.30
Clairton Pa. U5 ....8.30
Cleveland R2 ....8.30
Ecorse,Mich. G5 ....8.30
Fairfield,Ala. T2 ....8 30
Fontana,Calif. K1 ....9.00
Gary Ind. U5 ....8.30
Houston S5 ....8 55
Ind Harbor Ind. Y1 ....8.30
Johnstown Pa. B2 ....8.30
KansasCity,Mo. S5 ....8.55
Lackawanna,N.Y. R2 ..8.30
LosAngeles B3 ....9 00
Pittsburgh J5 ....8.30
Seattle B3 ....9.05
S.Chicago,Ill. R2, W14..8.30
S Duquesne Pa. U5 ....8 30
S SanFrancisco B3 ....9.05
Struthers,O. Y1 ....8.30
Youngstown U5 ....8.30

BAR SIZE ANGLES; H.R. Carbon
Bethlehem,Pa.(9) B2 ..5.825
Houston(9) S5 ....5.925
KansasCity,Mo.(9)S5 ..5.925
Lackawanna(9) B2 ....5.675
Sterling,Ill. N15 ....5.775
Sterling Ill.(1) N15 ...5 675
Tonawanda,N.Y. B12 ..5.675

BAR SIZE ANGLES; S. Shapes
Aliquippa,Pa. J5 ....5.675
Atlanta A11 ....5.875
Joliet,Ill. P22 ....5.675
Minnequa,Colo. C10 ...6.125
Niles,Calif. P1 ....6 375
Pittsburgh J5 ....5.675
Portland Oreg. O4 ....6.425
SanFrancisco S7 ....6 52
Seattle B3 ....6.425

BAR SHAPES, Hot-Rolled Alloy
Aliquippa Pa. J5 ....6 80
Clairton,Pa. U5 ....6.80
Gary,Ind. U5 ....6.80
Houston S5 ....7.05
KansasCity,Mo. S5 ....7.05
Pittsburgh J5 ....6.80
Youngstown U5 ....6.80

BARS, C.F. Loaded (Including loaded extra)
Carbon
LosAngeles P2, S30 ..11.75*

Alloy
Ambridge Pa. W18 ..10.175
BeaverFalls,Pa. M12..10 175
Camden,N J P13 ....10.35
Chicago W18 ....10.175
Elyria,O. W18 ....10.175
Monaca,Pa. S17 ....10.175
Newark N J. W18 ....10.35
SpringCity,Pa. K3 ....10.35

*Grade A; add 0.05c for Grade B.

BARS, Cold-Finished Carbon
Ambridge,Pa W18 ....7.65
BeaverFalls,Pa. M12,R2..7 65
B'rmingham C15 ....8.25
Buffalo B5 ....7.70
Camden,N J. P13 ....8.10
Carnegie Pa. C12 ....7 65
Chicago W18 ....7.65
Cleveland A7, C20 ....7.65
Detroit B5, P17 ....7.85
Detroit S41 ....7 65
Donora,Pa. A7 ....7.65
Elyria,O. W8 ....7 65
FranklinPark,Ill. N5 ...7 65
Gary Ind. R2 ....7.65
GreenBay,Wis. P7 ....7.65
Hammond,Ind. J5, L2 ..7 65
Hartford,Conn. R2 ....8.15
Harvey Ill. B5 ....7.65
LosAngeles(9) S30 ....9.10
LosAngeles(9) P2, R2..9 10
Mansfield,Mass. B5 ....8 20
Massillon,O. R2, R8 ...7.65
Midland Pa. C18 ....7.65
Monaca Pa. S17 ....7.65
Newark N J. W18 ....8.10
NewCastle,Pa.(17) B4 ..7.55
Pittsburgh J5 ....7.65
Plymouth,Mich. P5 ....7 90
Putnam,Conn. W18 ....8.20
Readville,Mass. C14 ....8.20
S.Chicago Ill. W14 ....7.65
SpringCity,Pa. K3 ....8.10
Struthers,O. Y1 ....7.65
Warren,O. C17 ....7.65
Waukegan,Ill. A7 ....7.65
Willimantic,Conn. J5 ..8.15
Youngstown F3, Y1 ....7.65

BARS, Cold-Finished Carbon (Turned and Ground)
Cumberland,Md.(5) C19.6.55

BARS, Cold-Finished Alloy
Ambridge,Pa. W18 ....9 025
BeaverFalls,Pa.M12,R2 9 025
Bethlehem Pa. B2 ....9.025
Bridgeport Conn. C32 ..9.175
Buffalo B5 ....9.025
Camden,N.J. P13 ....9.20
Canton,O. T7 ....9.025
Carnegie,Pa. C12 ....9 025
Chicago W18 ....9 025
Cleveland A7, C20 ....9 025
Detroit B5, P17 ....9.225
Detroit S41 ....9.025
Donora,Pa. A7 ....9.025
Elyria,O. W8 ....9.025
FranklinPark Ill. N5 ..9 025
Gary,Ind. R2 ....9.025
GreenBay,Wis. P7 ....9.025
Hammond,Ind. J5, L2..9 025
Hartford,Conn. R2 ....9.325
Harvey,Ill. R5 ....9.025
Lackawanna,N.Y. B2..9.025
LosAnge'es P2, S30 ...11.00
Mansfield,Mass. B5 ...9.325
Massillon,O. R2 R8 ...9 025
Midland,Pa. C18 ....9.025
Monaca,Pa. S17 ....9.025
Newark,N.J. W18 ....9.20
Plymouth,Mich. P5 ....9 225
S.Chicago,Ill. W14 ....9.025
SpringCity Pa. K3 ....9.20
Struthers,O. Y1 ....9.025
Warren,O. C17 ....9.025
Waukegan,Ill. A7 ....9.025
Willimantic,Conn. J5 ..9.325
Worcester,Mass. A7 ...9.325
Youngstown F3, Y1 ...9.025

BARS, Reinforcing, Billet (To Fabricators)

AlabamaCity,Ala. R2 ..5.675
Atlanta A11 .....5.675
Birmingham C15 .....5.675
Buffalo R2 .....5.675
Cleveland R2 .....5.675
Ecorse,Mich. G5 .....5.675
Emeryville,Calif. J7 ...6.425
Fairfield,Ala. T2 .....5.675
Fairless,Pa. U5 .....5.825
Fontana,Calif. K1 ....6.375
Ft.Worth,Tex(4)(26)T4 5.925
Gary,Ind. U5 .....5.675
Houston S5 .....5.925
Ind.Harbor,Ind. I-2, Y1 5.675
Johnstown,Pa. B2 ....5.675
Joliet,Ill. P22 .....5.675
KansasCity,Mo. S5 ....5.925
Kokomo,Ind. C16 ....5.775
Lackawanna,N.Y. B2..5.675
LosAngeles B3 .....6.375
Madison,Ill. L1 .....5.875
Milton,Pa. M18 .....5.825
Minnequa,Colo. C10 ..6.125
Niles,Calif. P1 .....6.375
Pittsburg,Calif. C11 ..6.375
Pittsburgh J5 .....5.675
Portland,Oreg. O4 ....6.425
SandSprings,Okla. S5 ..5.925
Seattle A24, B3, N14 ..6.425
S.Chicago,Ill. R2, W14 5.675
S.Duquesne,Pa. U5 ....5.675
S.SanFrancisco B3 ....6.425
SparrowsPoint,Md. B2..5.675
Sterling,Ill. (1) N15 ...5.675
Sterling,Ill. N15 .....5.775
Struthers,O. Y1 .....5.675
Tonawanda,N.Y. B12 ..6.10
Torrance,Calif. C11 ..6.375
Youngstown R2, U5 ..5.675

BARS, Reinforcing, Billet (Fabricated: To Consumers)

Baltimore B2 .....7.42
Boston B2, U8 .....8.15
Chicago U8 .....7.41
Cleveland U8 .....7.39
Houston S5 .....7.60
Johnstown,Pa. B2 .....7.33
KansasCity,Mo. S5 .....7.60
Lackawanna,N.Y. B2 ..7.35
Marion,O. P11 .....6.70
Newark,N.J. U8 .....7.80
Philadelphia U8 .....7.63
Pittsburgh J5, U8 .....7.35
SandSprings,Okla. S5 ..7.60
Seattle A24, B3, N14 ..7.95
SparrowsPt.,Md. B2 ..7.33
St. Paul U8 .....8.17
Williamsport,Pa. S19 ..7.25

BARS, Wrought Iron

Economy,Pa.(S.R.)B14 14.90
Economy,Pa.(D.R.)B14 18.55
Economy(Staybolt)B14 19.00
McK.Rks. (S.R.) L5 ..14.50
McK.Rks.(D.R.) L5 ..19.80
McK.Rks.(Staybolt)L5 20.95

BARS, Rail Steel

ChicagoHts.(3) C2, I-2 5.575
ChicagoHts.(4) (44) I-2 5.675
ChicagoHts. (4) C2 ...5.675
Franklin,Pa. (3) F5 ..5.575
Franklin Pa. (4) F5 ..5.675
JerseyShore,Pa.(3) J8 ..5.55
Marion,O.(3) P11 ....5.575
Tonawanda(3) B12 ....5.575
Tonawanda(4) B12 ....6.10

SHEETS

SHEETS, Hot-Rolled Steel (18 Gage and Heavier)

AlabamaCity,Ala. R2 ..5.10
Allenport,Pa. P7 .....5.10
Aliquippa,Pa. J5 .....5.10
Ashland,Ky.(8) A10 ..5.10
Cleveland J5, R2 .....5.10
Conshohocken,Pa. A3 ..5.15
Detroit (8) M1 .....5.10
Ecorse,Mich. G5 .....5.10
Fairfield,Ala. T2 .....5.10
Fairless,Pa. U5 .....5.15
Farrell,Pa. S3 .....5.10
Fontana,Calif. K1 ....5.825
Gary,Ind. U5 .....5.10
Geneva,Utah C11 .....5.20
GraniteCity,Ill.(8) G4 ..5.20
Ind.Harbor,Ind. I-2, Y1.5.10
Irvin,Pa. U5 .....5.10
Lackawanna,N.Y. B2 ..5.10
Mansfield,O. E6 .....5.10
Munhall,Pa. U5 .....5.10
Newport,Ky. A2 .....5.10
Niles,O. M21, S3 .....5.10
Pittsburg,Calif. C11 ....5.80
Pittsburgh J5 .....5.10
Portsmouth,O. P12 ....5.10
Riverdale,Ill. A1 .....5.10
Sharon,Pa. S3 .....5.10
S.Chicago,Ill. U5, W14..5.10
SparrowsPoint,Md. B2 ..5.10
Stuebenville,O. W10 ....5.10
Warren,O. R2 .....5.10
Weirton,W.Va. W6 ....5.10
Youngstown U5, Y1 ....5.10

SHEETS, H.R. (19 Ga. & Lighter)

Niles,O. M21, S3 .....6.275

SHEETS, H.R., Alloy

Gary,Ind. U5 .....8.40
Ind.Harbor,Ind. Y1 ....8.40
Irvin,Pa. U5 .....8.40
Munhall,Pa. U5 .....8.40
Newport,Ky. A2 .....8.40
Youngstown U5, Y1 ....8.40

SHEETS, H.R. (14 Ga. & Heavier) High-Strength, Low Alloy

Aliquippa,Pa. J5 .....7.525
Ashland,Ky. A10 .....7.525
Cleveland J5, R2 .....7.525
Conshohocken,Pa. A3 ..7.575
Ecorse,Mich. G5 .....7.525
Fairfield,Ala. T2 .....7.525
Fairless,Pa. U5 .....7.575
Farrell,Pa. S3 .....7.525
Fontana,Calif. K1 ....8.25
Gary,Ind. U5 .....7.525
Ind.Harbor,Ind. I-2, Y1 7.525
Irvin,Pa. U5 .....7.525
Lackawanna (35) B2 ..7.525
Munhall,Pa. U5 .....7.525
Niles,O. S3 .....7.525
Pittsburgh J5 .....7.525
S.Chicago,Ill. U5, W14 7.525
Sharon,Pa. S3 .....7.525
SparrowsPoint(36) B2..7.525
Warren,O. R2 .....7.525
Weirton,W.Va. W6 ....7.525
Youngstown U5, Y1 ..7.525

SHEETS, Hot-Rolled Ingot Iron (18 Gage and Heavier)

Ashland,Ky.(8) A10 ..5.35
Cleveland R2 .....5.875
Warren,O. R2 .....5.875

SHEETS, Cold-Rolled Ingot Iron

Cleveland R2 .....7.05
Middletown,O. A10 ....6.775
Warren,O. R2 .....7.05

SHEETS, Cold-Rolled Steel (Commercial Quality)

AlabamaCity,Ala. R2 .6.275
Aliquippa,Pa. J5 .....6.275
Allenport,Pa. P7 .....6.275
Cleveland J5, R2 .....6.275
Conshohocken,Pa. A3..6.325
Detroit M1 .....6.275
Ecorse,Mich. G5 .....6.275
Fairfield,Ala. T2 .....6.275
Fairless,Pa. U5 .....6.325
Follansbee,W.Va. F4 ..6.275
Fontana,Calif. K1 ....7.40
Gary,Ind. U5 .....6.275
GraniteCity,Ill. G4 ....6.375
Ind.Harbor,Ind. I-2, Y1 6.275
Irvin,Pa. U5 .....6.275
Lackawanna,N.Y. B2..6.275
Mansfield,O. E6 .....6.275
Middletown,O. A10 ....6.275
Newport,Ky. A2 .....6.275
Pittsburg,Calif. C11 ..7.225
Pittsburgh J5 .....6.275
Portsmouth,O. P12 ....6.275
SparrowsPoint,Md. B2.6.275
Steubenville,O. W10 ..6.275
Warren,O. R2 .....6.275
Weirton,W.Va. W6 ....6.275
Yorkville,O. W10.....6.275
Youngstown Y1 .....6.275

SHEETS, Cold-Rolled, High-Strength, Low-Alloy

Aliquippa,Pa. J5 .....9.275
Cleveland J5, R2 .....9.275
Ecorse,Mich. G5 .....9.275
Fairless Pa. U5 .....9.325
Fontana,Calif. K1 ....10.40
Gary,Ind. U5 .....9.275
Ind.Harbor,Ind. I-2, Y1 9.275
Lackawanna(37) B2 ..9.275
Pittsburgh J5 .....9.275
SparrowsPoint(38) B2..9.275
Warren,O. R2 .....9.275
Weirton,W.Va. W6 ....9.275
Youngstown Y1 .....9.275

SHEETS, Culvert

	Cu Steel	Cu Fee
Ala.City,Ala. R2	7.225	....
Ashland,Ky. A10	7.225	7.475
Canton,O. R2	7.225	7.75
Fairfield,Ala. T2	7.225	7.475
Gary,Ind. U5	7.225	7.475
GraniteCity,Ill.G4	7.325	....
Ind.Harbor I-2	7.225	7.475
Irvin,Pa. U5	7.225	7.475
Kokomo,Ind. C16	7.325	....
MartinsFry. W10	7.225	7.475
Pitts.,Calif. C11	7.975	....
Pittsburgh J5	7.225	....
SparrowsPt. B2	7.225	....

SHEETS, Culvert—Pure Iron

Ind.Harbor,Ind. I-2 ....7.475

SHEETS, Galvanized Steel Hot-Dipped

AlabamaCity,Ala. R2 .6.875‡
Ashland,Ky. A10 ....6.875†
Canton,O. R2 .....6.875‡
Dover,O. E6 .....6.875†
Fairfield,Ala. T2 ....6.875†
Gary,Ind. U5 .....6.875†
GraniteCity,Ill. G4 ...6.975*
Ind.Harbor,Ind. I-2 ..6.875†
Irvin,Pa. U5 .....6.875†
Kokomo,Ind. C16 ....6.975‡
MartinsFerry,O. W10 6.875*
Middletown,O. A10 ..6.875†
Pittsburg,Calif. C11 ..7.625*
Pittsburgh J5 .....6.875†
SparrowsPt.,Md. B2 ..6.875†
Warren,O. R2 .....6.875†
Weirton,W.Va. W6 ..6.875*

*Continuous and noncontinuous. †Continuous. ‡Noncontinuous.

SHEETS, Well Casing

Fontana,Calif. K1 ....7.325

SHEETS, Galvanized High-Strength, Low-Alloy

Irvin Pa. U5 .....10.125
Pittsburgh J5 .....10.125
SparrowsPt.(39) B2 ..10.025

SHEETS, Galvannealed Steel

Canton,O. R2 .....7.275
Irvin,Pa. U5 .....7.275

SHEETS, Galvanized Ingot Iron (Hot-Dipped Continuous)

Ashland,Ky. A10 .....7.125
Middletown,O. A10 ....7.125

SHEETS, Electrogalvanized

Cleveland(28) B2 .....7.65
Niles,O. (28) R2 .....7.65
Weirton,W.Va. W6 ....7.50
Youngstown J5 .....7.50

SHEETS, Aluminum Coated

Butler,Pa. A10 (type 1) 9.525
Butler,Pa. A10 (type 2) 9.625

SHEETS, Enameling Iron

Ashland,Ky. A10 .....6.775
Cleveland R2 .....6.775
Fairfield,Ala. T2 .....6.775
Gary,Ind. U5 .....6.775
GraniteCity,Ill. G4 ....6.875
Ind.Harbor,Ind. I-2, Y1 6.775
Irvin,Pa. U5 .....6.775
Middletown,O. A10 ....6.775
Niles,O. M21, S3 .....6.775
Youngstown Y1 .....6.775

BLUED STOCK, 29 Gage

Dover,O. E6 .....8.70
Follansbee,W.Va. F4 ..8.70
Ind.Harbor,Ind. I-2 ....8.70
Mansfield,O. E6 .....8.70
Warren,O. R2 .....8.70
Yorkville,O. W10 .....8.70

SHEETS, Long Terne, Steel (Commercial Quality)

BeechBottom,W.Va.W107.225
Gary,Ind. U5 .....7.225
Mansfield,O. E6 .....7.225
Middletown,O. A10 ....7.225
Niles,O. M21, S3 .....7.225
Warren,O. R2 .....7.225
Weirton,W.Va. W6 ....7.225

SHEETS, Long Terne, Ingot Iron

Middletown,O. A10 ....7.625

Key to Producers

A1 Acme Steel Co.
A2 Acme-Newport Steel Co.
A3 Alan Wood Steel Co.
A4 Allegheny Ludlum Steel
A5 Alloy Metal Wire Div., H. K. Porter Co. Inc.
A6 American Shim Steel Co.
A7 American Steel & Wire Div., U. S. Steel Corp.
A8 Anchor Drawn Steel Co.
A9 Angell Nail & Chaplet
A10 Armco Steel Corp.
A11 Atlantic Steel Co.
A24 Alaska Steel Mills Inc.

B1 Babcock & Wilcox
B2 Bethlehem Steel Co.
B3 Bethlehem Steel Co., Pacific Coast Div.
B4 Blair Strip Steel Co.
B5 Bliss & Laughlin Inc.
B8 Braeburn Alloy Steel
B9 Brainard Steel Div., Sharon Steel Corp.
B10 E. & G. Brooke, Wickwire Spencer Steel Div., Colo. Fuel & Iron
B12 Buffalo Steel Corp.
B14 A. M. Byers Co.
B15 J. Bishop & Co.

C1 Calstrip Steel Corp.
C2 Calumet Steel Div., Borg-Warner Corp.
C4 Carpenter Steel Co.
C9 Colonial Steel Co.
C10 Colorado Fuel & Iron
C11 Columbia-Geneva Steel
C12 Columbia Steel & Shaft.
C13 Columbia Tool Steel Co.
C14 Compressed Steel Shaft.
C15 Connors Steel Div., H. K. Porter Co. Inc.
C16 Continental Steel Corp.
C17 Copperweld Steel Co.
C18 Crucible Steel Co.
C19 Cumberland Steel Co.
C20 Cuyahoga Steel & Wire
C22 Claymont Plant, Wickwire Spencer Steel Div., Colo. Fuel & Iron
C23 Charter Wire Inc.
C24 G. O. Carlson Inc.
C32 Carpenter Steel ofN.Eng.

D2 Detroit Steel Corp.
D4 Disston Div., H. K. Porter Co. Inc.
D6 Driver-Harris Co.
D7 Dickson Weatherproof Nail Co.
D8 Damascus Tube Co.
D9 Wilbur B. Driver Co.

E1 Eastern Gas & Fuel Assoc.
E2 Eastern Stainless Steel
E5 Elliott Bros. Steel Co.
E6 Empire-Reeves Steel Corp.
E10 Enamel Prod. & Plating

F2 Firth Sterling Inc.
F3 Fitzsimmons Steel Co.
F4 Follansbee Steel Corp.
F5 Franklin Steel Div., Borg-Warner Corp.
F6 Fretz-Moon Tube Co.
F7 Ft. Howard Steel & Wire
F8 Ft. Wayne Metals Inc.

G4 Granite City Steel Co.
G5 Great Lakes Steel Corp.
G6 Greer Steel Co.
G8 Green River Steel Corp.

H1 Hanna Furnace Corp.
H7 Helical Tube Co.

I-1 Igoe Bros. Inc.
I-2 Inland Steel Co.
I-3 Interlake Iron Corp.
I-4 Ingersoll Steel Div., Borg-Warner Corp.
I-6 Ivins Steel Tube Works
I-7 Indiana Steel & Wire Co.

J1 Jackson Iron & Steel Co.
J3 Jessop Steel Co.
J4 Johnson Steel & Wire Co.
J5 Jones & Laughlin Steel
J6 Joslyn Mfg. & Supply
J7 Judson Steel Corp.
J8 Jersey Shore Steel Co.

K1 Kaiser Steel Corp.
K2 Keokuk Electro-Metals
K3 Keystone Drawn Steel
K4 Keystone Steel & Wire
K7 Kenmore Metals Corp.

L1 Laclede Steel Co.
L2 LaSalle Steel Co.
L3 Latrobe Steel Co.
L6 Lone Star Steel Co.
L7 Lukens Steel Co.
L8 Leschen Wire Rope Div., H. K. Porter Co. Inc.

M1 McLouth Steel Corp.
M4 Mahoning Valley Steel
M6 Mercer Pipe Div., Sawhill Tubular Products
M8 Mid-States Steel & Wire
M12 Moltrup Steel Products
M14 McInnes Steel Co.
M16 Md. Fine & Specialty Wire Co. Inc.
M17 Metal Forming Corp.
M18 Milton Steel Div., Merritt-Chapman&Scott
M21 Mallory-Sharon Metals Corp.
M22 Mill Strip Products Co.

N1 National-Standard Co.
N2 National Supply Co.
N3 National Tube Div., U. S. Steel Corp.
N5 Nelsen Steel & Wire Co.
N6 New England High Carbon Wire Co.
N8 Newman-Crosby Steel
N14 Northwest. Steel Rolling Mills Inc.
N15 Northwestern S.&W. Co.
N20 Neville Ferro Alloy Co.

O4 Oregon Steel Mills

P1 Pacific States Steel Corp.
P2 Pacific Tube Co.
P4 Phoenix Steel Corp.
P5 Pilgrim Drawn Steel
P6 Pittsburgh Coke & Chem.
P7 Pittsburgh Steel Co.
P11 Pollak Steel Co.
P12 Portsmouth Div., Detroit Steel Corp.
P13 Precision Drawn Steel
P15 Pittsburgh Metallurgical
P16 Page Steel & Wire Div., American Chain & Cable
P17 Plymouth Steel Corp.
P19 Pitts. Rolling Mills
P20 Prod. Steel Strip Corp.
P22 Phoenix Mfg. Co.
P24 Phil. Steel & Wire Corp.

R2 Republic Steel Corp.
R3 Rhode Island Steel Corp.
R5 Roebling's Sons, John A.
R6 Rome Strip Steel Co.
R8 Reliance Div.,EatonMfg.
R9 Rome Mfg. Co.
R10 Rodney Metals Inc.

S1 Seneca Wire & Mfg. Co.
S3 Sharon Steel Corp.
S4 Sharon Tube Co.
S5 Sheffield Div., Armco Steel Corp.
S6 Shenango Furnace Co.
S7 Simmons Co.
S8 Simonds Saw & Steel Co.
S12 Spencer Wire Corp.
S13 Standard Forgings Corp.
S14 Standard Tube Co.
S15 Stanley Works
S17 Superior Drawn Steel Co.
S18 Superior Steel Div., Copperweld Steel Co.
S19 Sweet's Steel Co.
S20 Southern States Steel
S23 Superior Tube Co.
S25 Stainless Welded Prod.
S26 Specialty Wire Co. Inc.
S30 Sierra Drawn Steel Corp.
S40 Seneca Steel Service
S41 Stainless & Strip Div., J&L Steel Corp.
S42 Southern Elec. Steel Co.
S43 Seymour Mfg. Co.
S44 Screw & Bolt Corp. of America

T2 Tenn. Coal & Iron Div., U. S. Steel Corp.
T3 Tenn. Products & Chemical Corp.
T4 Texas Steel Co.
T5 Thomas Strip Div., Pittsburgh Steel Co.
T6 Thompson Wire Co.
T7 Timken Roller Bearing
T9 Tonawanda Iron Div., Am. Rad. & Stan. San.
T13 Tube Methods Inc.
T19 Techalloy Co. Inc.

U3 Union Wire Rope Corp.
U4 Universal-Cyclops Steel
U5 United States Steel Corp.
U6 U. S. Pipe & Foundry
U7 Ulbrich Stainless Steels
U8 U. S. Steel Supply Div., U. S. Steel Corp.
U11 Union Carbide Metals Co.
U13 Union Steel Corp.

V2 Vanadium-Alloys Steel
V3 Vulcan-Kidd Steel Div., H. K. Porter Co.

W1 Wallace Barnes Steel Div., Associated Spring Corp.
W2 Wallingford Steel Co.
W3 Washburn Wire Co.
W4 Washington Steel Corp.
W6 Weirton Steel Co.
W8 Western Automatic Machine Screw Co.
W9 Wheatland Tube Co.
W10 Wheeling Steel Corp.
W12 Wickwire Spencer Steel Div., Colo. Fuel & Iron
W13 Wilson Steel & Wire Co.
W14 Wisconsin Steel Div., International Harvester
W15 Woodward Iron Co.
W18 Wyckoff Steel Co.

Y1 Youngstown Sheet & Tube

STRIP

STRIP, Hot-Rolled Carbon

Ala.City,Ala.(27) R2 ...5.10
Allenport,Pa. P7 .....5.10
Alton,Ill. L1 .....5.30
Ashland,Ky.(8) A10 ...5.10
Atlanta A11 .....5.10
Bessemer,Ala. T2 .....5.10
Birmingham C15 .....5.10
Buffalo(27) R2 .....5.10
Conshohocken,Pa. A3 ..5.15
Detroit M1 .....5.10
Ecorse,Mich. G5 .....5.10
Fairfield,Ala. T2 .....5.10
Farrell,Pa. S3 .....5.10
Fontana,Calif. K1 ....5.825
Gary,Ind. U5 .....5.10
Ind.Harbor,Ind. I-2, Y1..5.10
Johnstown,Pa.(25) B2 ..5.10
Lackaw'na,N.Y.(25) B2.5.10
LosAngeles(25) B3 ....5.85
LosAngeles C1 .....8.60
Minnequa,Colo. C10 ....6.20
Riverdale,Ill. A1 .....5.10
SanFrancisco S7 .....6.60
Seattle(25) B3 .....6.10
Seattle N14 .....6.60
Sharon,Pa. S3 .....5.10
S.Chicago,Ill. W14 ....5.10
S.SanFrancisco(25) B3..5.85
SparrowsPoint,Md. B2 ..5.10
Torrance,Calif. C11 ....5.85
Warren,O. R2 .....5.10
Weirton,W.Va. W6 ....5.10
Youngstown U5 .....5.10

STRIP, Hot-Rolled Alloy

Carnegie,Pa. S18 .....8.40
Farrell,Pa. S3 .....8.40
Gary,Ind. U5 .....8.40
Houston S5 .....8.65
Ind.Harbor,Ind. Y1 ....8.40
KansasCity,Mo. S5 ....8.65
LosAngeles B3 .....9.60
Lowellville,O. S3 .....8.40
Newport,Ky. A2 .....8.40
Sharon,Pa. A2, S3 .....8.40
S.Chicago,Ill. W14 ....8.40
Youngstown U5, Y1 ....8.40

STRIP, Hot-Rolled High-Strength, Low-Alloy

Ashland,Ky. A10 .....7.575
Bessemer,Ala. T2 .....7.575
Conshohocken,Pa. A3 ..7.575
Ecorse,Mich. G5 .....7.575
Fairfield,Ala. T2 .....7.575
Farrell,Pa. S3 .....7.575
Gary,Ind. U5 .....7.575
Ind.Harbor,Ind. I-2, Y1 7.575
Lackawanna,N.Y. B2 ..7.575
LosAngeles(25) B3 ....8.325
Seattle(25) B3 .....8.575
Sharon,Pa. S3 .....7.575
S.Chicago,Ill. W14 ....7.575
S.SanFrancisco(25) B3.8.325
SparrowsPoint,Md. B2 .7.575
Warren,O. R2 .....7.575
Weirton,W.Va. W6 ....7.575
Youngstown U5, Y1 ...7.575

STRIP, Hot-Rolled Ingot Iron

Ashland,Ky.(8) A10 ...5.35
Warren,O. R2 .....5.875

STRIP, Cold-Rolled Carbon

Anderson,Ind. G6 .....7.425
Baltimore T6 .....7.425
Boston T6 .....7.975
Buffalo S40 .....7.425
Cleveland A7, J5 .....7.425
Dearborn,Mich. S3 ....7.425
Detroit D2, M1, P20...7.425
Dover,O. G6 .....7.425
Evanston,Ill. M22 ....7.525
Farrell,Pa. S3 .....7.425
Follansbee,W.Va. W10 .7.425
Fontana,Calif. K1 .....9.20
FranklinPark,Ill. T6 ..7.525
Ind.Harbor Ind. Y1 ...7.425
Indianapolis S41 .....7.575
LosAngeles C1, S41 ....9.30
McKeesport,Pa. E10 ..7.525
NewBedford,Mass. R10 .7.875
NewBritain,Conn. S15..7.875
NewCastle,Pa. B4, E5 .7.425
NewHaven,Conn. D2 ..7.875
NewKensington,Pa. A6.7.425
Pawtucket,R.I. R3 ....7.975
Pawtucket,R.I. N8 ....7.975
Philadelphia P24 .....7.875
Pittsburgh J5 .....7.425
Riverdale,Ill. A1 .....7.525
Rome,N.Y.(32) R6 ....7.425
Sharon,Pa. S3 .....7.425
Trenton,N.J (31) R5 ..8.875
Wallingford,Conn. W2..7.875
Warren,O. R2, T5 .....7.425
Worcester,Mass. A7 ...7.975

STRIP, Cold-Rolled Alloy

Boston T6 .....15.90
Carnegie,Pa. S18 .....15.55
Cleveland A7 .....15.55
Dover,O. G6 .....15.55
Farrell,Pa. S3 .....15.55
FranklinPark,Ill. T6 ..15.55
Harrison,N.J. C18 .....15.55
Indianapolis S41 .....15.70
LosAngeles S41 .....17.75
Lowellville,O. S3 .....15.55
Pawtucket,R.I. N8 ....15.90
Riverdale,Ill. A1 .....15.55
Sharon,Pa. S3 .....15.55
Worcester,Mass. A7 ...15.85
Youngstown S41 .....15.55

STRIP, Cold-Rolled High-Strength, Low-Alloy

Cleveland A7 .....10.80
Dearborn,Mich. S3 ....10.80
Dover,O. G6 .....10.80
Farrell,Pa. S3 .....10.80
Ind.Harbor,Ind. Y1 ...10.80
Sharon,Pa. S3 .....10.80
Warren,O. R2 .....10.80

STRIP, Cold-Finished Spring Steel (Annealed)	0.26-0.40C	0.41-0.60C	0.61-0.80C	0.81-1.05C	1.06-1.35C
Baltimore T6	9.30	10.70	12.90	15.90	18.85
Boston T6	9.50	10.70	12.90	15.90	18.85
Bristol,Conn. W1	....	10.70	12.90	16.10	19.30
Carnegie,Pa. S18	8.95	10.40	12.60	15.60	....
Cleveland A7	8.95	10.40	12.60	15.60	18.55
Dearborn,Mich. S3	9.05	10.50	12.70	....	....
Detroit D2	9.05	10.50	12.70	15.70	....
Dover,O. G6	8.95	10.40	12.60	15.60	18.55
Evanston,Ill. M22	8.95	10.40	12.60	15.60	....
Farrell,Pa. S3	8.95	10.40	12.60	15.60	18.55
Fostoria,O. S1	10.05	10.40	12.60	15.60	....
FranklinPark,Ill. T6	9.05	10.40	12.60	15.60	18.55
Harrison,N.J. C18	....	....	12.90	16.10	19.30
Indianapolis S41	9.10	10.55	12.60	15.60	18.55
LosAngeles C1	11.15	12.60	14.80	17.80	....
LosAngeles S41	11.15	12.60	14.80	....	....
NewBritain,Conn. S15	9.40	10.70	12.90	15.90	18.85
NewCastle,Pa. B4, E5	8.95	10.40	12.60	15.60	....
NewHaven,Conn. D2	9.40	10.70	12.90	15.90	....
NewKensington,Pa. A6	9.85	10.40	12.60	15.60	....
NewYork W3	....	10.70	12.90	16.10	19.30
Pawtucket,R.I. N8	9.50	10.70	12.90	15.90	18.85
Riverdale,Ill. A1	9.05	10.40	12.60	15.60	18.55
Rome,N.Y.(32) R6	8.95	10.40	12.60	15.60	18.55
Sharon,Pa. S3	8.95	10.40	12.60	15.60	18.55
Trenton,N.J. R5	....	10.70	12.90	15.90	18.85
Wallingford,Conn. W2	9.40	10.70	12.90	15.90	18.75
Warren,O. T5	8.95	10.40	12.60	15.60	18.55
Worcester,Mass. A7, T6	9.50	10.70	12.90	15.90	18.85
Youngstown S41	8.95	10.40	12.60	15.60	18.55

Spring Steel (Tempered)	Up to 0.80C	0.81-1.05C	1.06-1.35C
Bristol,Conn. W1	18.85	22.95	27.80
Buffalo W12	18.85	....	....
Fostoria,O. S1	19.05	22.15	....
FranklinPark,Ill. T6	19.20	23.30	28.15
Harrison,N.J. C18	18.85	22.95	27.80
NewYork W3	18.85	22.95	27.80
Palmer,Mass. W12	18.85	....	....
Trenton,N.J. R5	18.85	22.95	27.80
Worcester,Mass. A7, T6	18.85	22.95	27.80
Youngstown S41	19.20	23.30	28.15

Weirton,W.Va. W6 ....10.80
Youngstown Y1 .....10.80

STRIP, Cold-Rolled Ingot Iron

Warren,O. R2 .....8.175

STRIP, C.R. Electrogalvanized

Cleveland A7 .....7.425*
Dover,O. G6 .....7.425*
Evanston,Ill. M22 ....7.525*
McKeesport,Pa. E10 ...7.50*
Riverdale,Ill. A1 ....7.525*
Warren,O. B9, S3, T5.7.425*
Worcester,Mass. A7 ...7.975
Youngstown S41, Y1..7.425*

*Plus galvanizing extras.

STRIP, Galvanized (Continuous)

Farrell,Pa. S3 .....7.50
Sharon,Pa. S3 .....7.50

TIGHT COOPERAGE HOOP

Atlanta A11 .....5.65
Farrell,Pa. S3 .....5.525
Riverdale,Ill. A1 .....5.675
Sharon,Pa. S3 .....5.525
Youngstown U5 .....5.525

SILICON STEEL

C.R. COILS & CUT LENGTHS (22 Ga.)

Fully Processed (Semiprocessed ½c lower)	Field	Armature	Electric	Motor	Dynamo
BeechBottom,W.Va. W10	....	11.70	12.40	13.35	14.65
Brackenridge,Pa. A4	....	....	12.40	13.55	14.65
GraniteCity,Ill. G4	9.975	*11.30*	12.00*	13.15*	....
IndianaHarbor,Ind. I-2	9.875	*11.20*	11.90*	13.05*	....
Mansfield,O. E6	9.875	*11.70	12.40	13.55	14.65
Newport,Ky. A2	9.875	11.70*	12.40*	13.55	*14.65*
Niles,O. M21	9.875	*11.70	12.40	13.55	....
Vandergrift,Pa. U5	9.875	*11.70	12.40	13.55	14.65
Warren,O. R2	9.875	*11.70	12.40	13.55	14.65
Zanesville,O. A10	....	11.70†	12.40	13.55	14.65

	Stator
Vandergrift,Pa. U5	8.10
Mansfield,O. E6	8.10
Warren,O. R2 (Silicon Lowcore)	8.10

SHEETS (22 Ga., coils & cut lengths) Fully Processed (Semiprocessed ½c lower)	T-72	T-65	T-58	T-52
BeechBottom,W.Va. W10	15.70	16.30	16.80	17.85
Vandergrift,Pa. U5	15.70	16.30	16.80	17.85
Zanesville,O. A10	15.70	16.30	16.80	17.85

C.R. COILS & CUT LENGTHS (22 Ga.)	Grain Oriented T-100	T-90	T-80	T-73	T-66	T-72
Brackenridge,Pa. A4	....	18.10	19.70	20.20	20.70	15.70††
Butler,Pa. A10	....	....	....	19.70	20.20	20.70 ....
Vandergrift,Pa. U5	.. 17.10	18.10	19.70	20.20	20.70	15.70
Warren,O. R2	....	....	....	....	....	.... 15.70‡

*Semiprocessed. †Fully processed only. ‡Coils, annealed; semiprocessed ½c lower. ††Coils only.

WIRE

WIRE, Manufacturers Bright, Low Carbon

AlabamaCity,Ala. R2 ..8.00
Aliquippa,Pa. J5 .....8.00
Alton,Ill. L1 .....8.20
Atlanta A1 .....8.00
Bartonville,Ill. K4 .....8.10
Buffalo W12 .....8.00
Chicago W13 .....8.00
Cleveland A7, C20 .....8.00
Crawfordsville,Ind. M8..8.10
Donora,Pa. A7 .....8.00
Duluth A7 .....8.00
Fairfield,Ala. T2 .....8.00
Fostoria,O.(24) S1 .....8.10
Houston S5 .....8.25
Jacksonville,Fla. M8 ...8.35
Johnstown,Pa. B2 .....8.00
Joliet,Ill. A7 .....8.00
KansasCity,Mo. S5 .....8.25
Kokomo,Ind. C16 .....8.10
LosAngeles B3 .....8.95
Minnequa,Colo. C10 ....8.25
Monessen,Pa. P7, P16 ..8.00
Palmer,Mass. W12 .....8.30
Pittsburg,Calif. C11 ...8.95
Portsmouth,O. P12 ....8.00
Rankin,Pa. A7 .....8.00
S.Chicago,Ill. R2 .....8.00
S.SanFrancisco C10 ....8.95
SparrowsPoint,Md. B2 ..8.10
Sterling,Ill.(1) N15 ....8.00
Sterling,Ill. N15 .....8.10
Struthers, O. Y1 .....8.00
Waukegan,Ill. A7 .....8.00
Worcester,Mass. A7 ....8.30

WIRE, Cold Heading Carbon

Elyria,O. W8 .....8.00

WIRE, Gal'd., for ACSR

Bartonville,Ill. K4 ....12.65
Buffalo W12 .....13.40
Cleveland A7 .....12.65
Donora,Pa. A7 .....12.65
Duluth A7 .....12.65
Johnstown,Pa. B2 .....13.40
KansasCity,Mo. U3 ....12.90
Minnequa,Colo. C10 ...12.775
Monessen,Pa. P7, P16..12.65
Muncie,Ind. I-7 .....13.60
NewHaven,Conn. A7 ...12.95
Palmer,Mass. W12 .....13.70
Pittsburg,Calif. C11 ....13.45
Portsmouth,O. P12 .....12.65
Roebling,N.J. R5 .....12.95
SparrowsPt.,Md. B2 ...13.50
Struthers,O. Y1 .....13.40
Trenton,N.J. A7 .....12.95
Waukegan,Ill. A7 .....12.65
Worcester,Mass. A7 ...12.95

WIRE, Upholstery Spring

Aliquippa,Pa. J5 .....9.75
Alton Ill. L1 .....9.95
Buffalo W12 .....9.75
Cleveland A7 .....9.75
Donora,Pa. A7 .....9.75
Duluth A7 .....9.75
Johnstown,Pa. B2 .....9.75
KansasCity,Mo. S5, U3.10.00
LosAngeles B3 .....10.70
Minnequa,Colo. C10 ....9.95
Monessen,Pa. P7, P16 ..9.75
NewHaven,Conn. A7 ..10.05
Palmer,Mass. W12 ....10.05
Pittsburg,Calif. C11 ...10.70
Portsmouth,O. P12 ....9.75
Roebling,N.J. R5 .....10.05
S.Chicago,Ill. R2 .....9.75
S.SanFrancisco C10 ...10.70
SparrowsPt.,Md. B2 ...9.85
Struthers,O. Y1 .....9.75
Trenton,N.J. A7 .....10.05
Waukegan,Ill. A7 .....9.75
Worcester,Mass. A7 ...10.05

WIRE, MB Spring, High-Carbon

Aliquippa,Pa. J5 .....9.75
Alton,Ill. L1 .....9.95
Bartonville,Ill. K4 .....9.85
Buffalo W12 .....9.75
Cleveland A7 .....9.75
Donora,Pa. A7 .....9.75
Duluth A7 .....9.75
Fostoria,O. S1 .....9.80
Johnstown,Pa. B2 .....9.75
KansasCity,Mo. S5, U3.10.00
LosAngeles B3 .....10.70
Milbury,Mass.(12) N6..10.05
Minnequa,Colo. C10 ....9.95
Monessen,Pa. P7, P16 ..9.75
Muncie,Ind. I-7 .....9.95
Palmer,Mass. W12 .....10.05
Pittsburg,Calif. C11 ...10.70
Portsmouth,O. P12 ....9.75
Roebling,N.J. R5 .....10.05
S.Chicago Ill. R2 .....9.75
S.SanFrancisco C10 ...10.70
SparrowsPt.,Md. B2 ...9.85
Struthers,O. Y1 .....9.75
Trenton,N.J. A7 .....10.05
Waukegan,Ill. A7 .....9.75
Wor'ster,Mass.A7,J4,T6 10.05

WIRE, Fine & Weaving(8" Coils)

Alton,Ill. L1 .....16.50
Bartonville,Ill. K4 ....16.40
Chicago W13 .....16.30
Cleveland A7 .....16.30
Crawfordsville,Ind. M8.16.40
Fostoria,O. S1 .....16.30
Houston S5 .....16.55
Jacksonville,Fla. M8 ..16.65
Johnstown,Pa. B2 ....16.30
KansasCity,Mo. S5 ....16.55
Kokomo,Ind. C16 .....16.30
Minnequa,Colo. C10 ....16.55
Monessen,Pa. P16 ....16.30
Muncie Ind. I-7 .....16.50
Palmer,Mass. W12 ....16.60
S SanFrancisco C10 ....17.15
Waukegan,Ill. A7 .....16.30
Worcester,Mass. A7, J6.16.60

WIRE, Tire Bead

Bartonville,Ill. K4 ....17.15
Monessen,Pa. P16 .....17.15
Roebling,N.J. R5 .....17.65

ROPE WIRE (A)

Bartonville,Ill. K4 ....13.45
Buffalo W12 .....13.45
Fostoria,O. S1 .....13.45
KansasCity,Mo. U3 ....13.70
Johnstown,Pa. B2 .....13.45
Monessen,Pa. P7 .....13.45
Muncie Ind. I-7 .....13.65
Palmer,Mass. W12 ....13.75
Portsmouth,O. P12 ....13.45
Roebling,N.J. R5 .....13.75
St.Louis L8 .....13.45
SparrowsPt.,Md. B2 ...13.55
Struthers O. Y1 .....13.45
Worcester,Mass. J4 ...13.75
(A) Plow and Mild Plow; add 0.25c for Improved Plow.

TIN MILL PRODUCTS

TIN PLATE, Electrolytic (Base Box)	0.25 lb	0.50 lb	0.75 lb
Aliquippa,Pa. J5	$9.10	$9.35	$9.75
Fairfield,Ala. T2	9.20	9.45	9.85
Fairless,Pa. U5	9.20	9.45	9.85
Fontana,Calif. K1	9.75	10.00	10.40
Gary,Ind. U5	9.10	9.35	9.75
GraniteCity,Ill. G4	9.20	9.45	9.60
IndianaHarbor,Ind. I-2, Y1	9.10	9.35	9.75
Irvin,Pa. U5	9.10	9.35	9.75
Niles,O. R2	9.10	9.35	9.75
Pittsburg,Calif. C11	9.75	10.00	10.40
SparrowsPoint,Md. B2	9.10	9.35	9.75
Weirton,W.Va. W6	9.10	9.35	9.75
Yorkville,O. W10	9.10	9.35	9.75

ELECTROLYTIC TIN-COATED SHEET (Dollars per 100 lb)			
IndianaHarbor,Ind. Y1 (20-27 Ga.)	7.90	....	....
Niles,O. R2 (20-27 Ga.)	7.90	8.10	8.30
Aliquippa,Pa. J5 (21-27 Ga.)	7.90	8.10	....

TIN PLATE, American	1.25 lb	1.50 lb
Aliquippa,Pa. J5	$10.40	$10.65
Fairfield,Ala. T2	10.50	10.75
Fontana,Calif.K1	11.05	11.30
Gary,Ind. U5	10.40	10.65
Ind.Harb. Y1	10.40	10.65
Irvin,Pa. U5	10.40	10.65
Pitts.,Calif. C11	11.05	11.30
Sp.Pt.,Md. B2	10.40	10.65
Weirton,W.Va.W6	10.40	10.65
Yorkville,O. W10	10.40	10.65

BLACK PLATE (Base Box)	
Aliquippa,Pa. J5	$8.20
Fairfield Ala. T2	8.30
Fairless,Pa. U5	8.30
Fontana,Calif. K1	8.85
Gary,Ind. U5	8.20
GraniteCity,Ill. G4	8.30
Ind.Harbor,Ind. I-2, Y1	8.20
Irvin,Pa. U5	8.20
Niles,O. R2	8.20
Pittsburg,Calif. C11	8.85
SparrowsPoint,Md. B2	8.20
Weirton,W.Va. W6	8.20
Yorkville,O. W10	8.20

HOLLOWARE ENAMELING Black Plate (29 Gage)	
Aliquippa,Pa. J5	7.85
Gary,Ind. U5	7.85
GraniteCity,Ill. G4	7.95
Ind.Harbor,Ind. Y1	7.85
Irvin,Pa. U5	7.85
Yorkville,O. W10	7.85

MANUFACTURING TERNES (Special Coated, Base Box)	
Gary,Ind. U5	$10.05
Irvin,Pa. U5	10.05

Wire, Cold-Rolled Flat

Anderson,Ind. G6	12.35
Baltimore T6	12.65
Boston T6	12.65
Buffalo W12	12.35
Chicago W13	12.45
Cleveland A7	12.35
Crawfordsville,Ind. M8	12.35
Dover,O. G6	12.35
Farrell,Pa. S3	12.35
Fostoria,O. S1	12.35
FranklinPark,Ill. T6	12.45
Kokomo,Ind. C16	12.35
Massillon,O. R3	12.35
Milwaukee C23	12.55
Monessen,Pa. P7, P16	12.35
Palmer,Mass. W12	12.65
Pawtucket,R.I. N5	12.65
Philadelphia P24	12.65
Riverdale,Ill. A1	12.45
Rome,N.Y. R6	12.35
Sharon,Pa. S3	12.35
Trenton,N.J. R5	12.65
Warren,O. B6	12.35
Worcester,Mass. A7,T6	12.65

NAILS, Stock — **Col.**

AlabamaCity,Ala. R2	173
Aliquippa,Pa. J5	173
Atlanta A11	175
Bartonville,Ill. K4	175
Chicago W13	173
Cleveland A9	173
Crawfordsville,Ind. M8	175
Donora,Pa. A7	173
Duluth A7	173
Fairfield,Ala. T2	173
Houston S5	178
Jacksonville,Fla. M8	175
Johnstown,Pa. B2	173
Joliet,Ill. A7	173
KansasCity,Mo. S5	178
Kokomo,Ind. C16	175
Minnequa,Colo. C10	178
Monessen,Pa. P7	173
Pittsburgh,Calif. C11	192
Rankin,Pa. A7	173
S.Chicago,Ill. R2	173
SparrowsPt.,Md. B2	175
Sterling,Ill.(7) N15	175
Worcester,Mass. A7	179

(To Wholesalers: per cwt)

Galveston,Tex. D7	$10.30

NAILS, Cut (100 lb keg) to Distributors (33)

Wheeling,W.Va. W10	$10.10

POLISHED STAPLES — **Col.**

AlabamaCity,Ala. R2	175
Aliquippa,Pa. J5	173
Atlanta A11	177
Bartonville,Ill. K4	175
Crawfordsville,Ind. M8	177
Donora,Pa. A7	173
Duluth A7	173
Fairfield,Ala. T2	173
Houston S5	180
Jacksonville,Fla. M8	177
Johnstown,Pa. B2	175
Joliet,Ill. A7	173
KansasCity,Mo. S5	180
Kokomo,Ind. C16	177
Minnequa,Colo. C10	180
Pittsburg,Calif. C11	194
Rankin,Pa. A7	173
S.Chicago,Ill. R2	175
SparrowsPt.,Md. B2	177
Sterling,Ill.(7) N15	175
Worcester,Mass. A7	181

TIE WIRE, Automatic Baler (14½ Ga.)(per 97 lb Net Box) Coil No. 3150

AlabamaCity,Ala. R2	$9.24
Atlanta A11	10.36
Bartonville,Ill. K4	9.34
Buffalo W12	10.26
Chicago W13	9.24
Crawfordsville,Ind. M8	9.34
Donora,Pa. A7	9.24
Duluth A7	9.24
Fairfield,Ala. T2	9.24
Houston S5	10.51
Jacksonville,Fla. M8	9.34
Johnstown,Pa. B2	10.26
Joliet,Ill. A7	9.24
KansasCity,Mo. S5	10.51
Kokomo,Ind. C16	9.34
LosAngeles B3	11.05
Minnequa,Colo. C10	10.51
Pittsburg,Calif. C11	9.94
S.Chicago,Ill. R2	9.24
S.SanFrancisco C10	11.04
SparrowsPt.,Md. B2	10.36
Sterling,Ill.(37) N15	9.34

Coil No. 6500 Stand.

AlabamaCity,Ala. R2	$9.54
Atlanta A11	10.70
Bartonville,Ill. K4	9.64
Buffalo W12	10.60
Chicago W13	9.54
Crawfordsville,Ind. M8	9.64
Donora,Pa. A7	9.54
Duluth A7	9.54
Fairfield,Ala. T2	9.54
Houston S5	10.85
Jacksonville,Fla. M8	9.64
Johnstown,Pa. B2	10.60
Joliet,Ill. A7	9.54
KansasCity,Mo. S5	10.85
Kokomo,Ind. C16	10.26
LosAngeles B3	11.40
Minnequa,Colo. C10	10.85
Pittsburg,Calif. C11	10.26
S.Chicago,Ill. R2	9.54
S.SanFrancisco C10	11.40
SparrowsPt.,Md. B2	10.70
Sterling,Ill.(37) N15	9.64

Coil No. 6500 Interim

AlabamaCity,Ala. R2	$9.59
Atlanta A11	10.75
Bartonville,Ill. K4	9.69
Buffalo W12	10.65
Chicago W13	9.59
Crawfordsville,Ind. M8	9.69
Donora,Pa. A7	9.59
Duluth A7	9.59
Fairfield,Ala. T2	9.59
Houston S5	10.90
Jacksonville,Fla. M8	9.69
Johnstown,Pa. B2	10.65
Joliet,Ill. A7	9.59
KansasCity,Mo. S5	10.90
Kokomo,Ind. C16	9.69
LosAngeles B3	11.45
Minnequa,Colo. C10	10.90
Pittsburg,Calif. C11	10.31
S.Chicago,Ill. R2	9.59
S.SanFrancisco C10	11.45
SparrowsPt.,Md. B2	10.75
Sterling,Ill.(37) N15	9.69

BALE TIES, Single Loop — **Col.**

AlabamaCity,Ala. R2	212
Atlanta A11	214
Bartonville,Ill. K4	214
Crawfordsville,Ind. M8	214
Donora,Pa. A7	212
Duluth A7	212
Fairfield,Ala. T2	212
Houston S5	217
Jacksonville,Fla. M8	214
Joliet,Ill. A7	212
KansasCity,Mo. S5	217
Kokomo,Ind. C16	214
Minnequa,Colo. C10	217
Pittsburg,Calif. C11	236
S.SanFrancisco C10	236
SparrowsPt.,Md. B2	214
Sterling,Ill.(7) N15	214

FENCE POSTS — **Col.**

Birmingham C15	177
ChicagoHts.,Ill. C2, I-2	177
Duluth A7	177
Franklin,Pa. F5	177
Johnstown,Pa. B2	177
Marion,O. P11	177
Minnequa,Colo. C10	182
Tonawanda,N.Y. B12	177

WIRE, Barbed — **Col.**

AlabamaCity,Ala. R2	193**
Aliquippa,Pa. J5	190§
Atlanta A11	198§
Bartonville,Ill. K4	198
Crawfordsville,Ind. M8	198
Donora,Pa. A7	193†
Duluth A7	193†
Fairfield,Ala. T2	193†
Houston S5	198**
Jacksonville,Fla. M8	198
Johnstown,Pa. B2	196§
Joliet,Ill. A7	193†
KansasCity,Mo. S5	198**
Kokomo,Ind. C16	195†
Minnequa,Colo. C10	198**
Monessen,Pa. P7	196§
Pittsburg,Calif. C11	213†
Rankin,Pa. A7	193†
S.Chicago,Ill. R2	193**
S.SanFrancisco C10	213*
SparrowsPoint,Md. B2	198§
Sterling,Ill.(7) N15	196

WOVEN FENCE, 9-15 Ga. — **Col.**

Ala.City,Ala. R2	187**
Aliq'ppa,Pa.9-11½ga.J5	190§
Atlanta A11	192§
Bartonville,Ill. K4	192
Crawfordsville,Ind. M8	192
Donora,Pa. A7	187†
Duluth A7	187†
Fairfield,Ala. T2	187†
Houston S5	192**
Jacksonville,Fla. M8	192
Johnstown,Pa.(43) B2	190§
Joliet,Ill. A7	187†
KansasCity,Mo. S5	192**
Kokomo,Ind. C16	189†
Minnequa,Colo. C10	192**
Pittsburg,Calif. C11	210†
Rankin,Pa. A7	187†
S.Chicago,Ill. R2	187**
Sterling,Ill.(7) N15	192

WIRE (16 gage) Stone Stone — **An'ld Galv.**

Ala.City,Ala.	R2 17.85	19.40**
Aliq'ppa,Pa.	J5 17.85	19.65
Bartonville	K4 17.95	19.80
Cleveland	A7 17.85	
Craw'dville	M8 17.95	19.80‡‡
Fostoria,O.	S1 18.35	19.90†
Houston	S5 18.10	19.65**
Jacksonville	M8 17.95	19.80‡‡
Johnstown	B2 17.85	19.65§
Kan.City,Mo.	S5 18.10	
Kokomo	C16 17.25	18.80†
Minnequa	C10 18.10	19.65**
P'lm'r,Mass.	W12 18.15	19.70†
Pitts.,Calif.	C11 18.20	19.75†
S.SanFran.	C10 18.20	19.75**
St'ling(37)	N15 17.95	19.80
SparrowsPt.	B2 17.95	19.75§
Waukegan	A7 17.85	19.40†
Worcester	A7 18.15	

WIRE, Merchant Quality (6 to 8 gage) An'ld Galv.

Ala.City,Ala.	R2 9.00	9.55**
Aliquippa	J5 8.65	9.325§
Atlanta(48)	A11 9.10	9.775‡
Bartonville(48)	K4 9.10	9.80
Buffalo	W12 9.00	9.55†
Cleveland	A7 9.00	
Crawfordsville	M8 9.10	9.80††
Donora,Pa.	A7 9.00	9.55†
Duluth	A7 9.00	9.55†
Fairfield	T2 9.00	9.55†
Houston(48)	S5 9.25	9.80**
Jack'ville	Fla. M8 9 10	9.80‡‡
Johnstown(48)	B2 9.00	9.675§
Joliet,Ill.	A7 9.00	9.55†
Kans.City(48)	S5 9.25	9.80**
Kokomo(48)	S16 9.10	9.65†
LosAngeles	B3 9.95	10.625§
Monessen(48)	P7 8.65	9.35§
Palmer,Mass.	W12 9.30	9.85†
Pitts.,Calif.	C11 9.95	10.50†
Rankin,Pa.	A7 9.00	9.55†
S.Chicago	R2 9.00	9.55**
S.SanFran.	C10 9.95	10.50**
Spar'wsPt.(48)	B2 9.10	9.775§
St'ling(37)(48)	N15 9.10	9.80
Struthers,O.	Y1 9.00	9.65‡
Worcester,Mass.	A7 9.30	9.85†

Based on zinc price of: *13.50. †5c. §10c. ‡Less than 10c. ††10.50c. ‡‡11.00c. **Subject to zinc equalization extras.

FASTENERS

(Base discounts, shipments of one to four containers, per cent off list,f.o.b. mill)

BOLTS

Machine Bolts
Full Size Body(cut thread)

½ in. and smaller:	
3 in. and shorter	55.0
3¼ in. thru 6 in.	50.0
Longer than 6 in.	37.0
⅝ in., 3 in. & shorter	47.0
3¼ in. thru 6 in.	40.0
Longer than 6 in.	31.0
¾ in. thru 1 in.:	
6 in. and shorter	37.0
Longer than 6 in.	31.0
1¼ in. and larger:	
All lengths	31.0

Undersize Body (rolled thread)

½ in. and smaller:	
3 in. and shorter	55.0
3¼ in. thru 6 in.	50.0

Carriage Bolts
Full Size Body (cut thread) & Undersize Body (rolled thread)

½ in. and smaller:	
6 in. and shorter	48.0
Larger diameters and longer lengths	35.0

Lag, Plow, Tap, Blank, Step, Elevator, Tire, and Fitting Up Bolts

½ in. and smaller:	
6 in. and shorter	48.0
Larger diameters and longer lengths	35.0

High Tensile Structural Bolts (Reg. semifinished hex head bolts, heavy semifinished hex nuts. Bolts — High-carbon steel, heat treated, Spec. ASTM A-325, in bulk. Full keg quantity)

⅝ in. diam	50.0
¾ in. diam	47.0
⅞ and 1 in. diam	43.0
1⅛ and 1¼ in. diam	34.0

NUTS
(Keg or case quantity and over)

Square Nuts, Reg. & Heavy:

All sizes	56.0

(Full container)

Hex Nuts, Reg. & Heavy Hot Pressed & Cold Punched:

⅝ in. and smaller	62.0
⅞ in. to 1½ in., incl.	56.0
1⅝ in. and larger	51.5

Hex Nuts, Semifinished, Heavy (Incl. Slotted):

⅝ in. and smaller	62.0
⅞ in. to 1½ in. incl.	56.0
1⅝ in. and larger	51.5

Hex Nuts, Finished (Incl. Slotted and Castellated):

⅞ in. and smaller	65.0
1 in. to 1½ in., incl.	57.0
1⅝ in. and larger	51.5

Semifinished Hex Nuts, Reg. (Incl. Slotted):

⅝ in. and smaller	62.0
⅞ in. to ⅞ in., incl.	65.0
1 in. to 1½ in., incl.	57.0
1⅝ in. and larger	51.5

CAP AND SETSCREWS
(Base discounts, packages, per cent off list, f.o.b. mill)

Hex Head Cap Screws, Course or Fine Thread, Bright:

6 in. and shorter:	
⅝ in. and smaller	35.0
¾ in. and 1 in.	16.0
Longer than 6 in.:	
⅝ in. and smaller	3.0
¾, ⅞, and 1 in.	+11.0

High Carbon, Heat Treated:
6 in. and shorter:

⅝ in. and smaller	20.0
¾, ⅞, and 1 in.	+ 5.0

Longer than 6 in.:

⅝ in. and smaller	+19.0
¾, ⅞, and 1 in.	+39.0

Flat Head Cap Screws:
6 in. and smaller, 6 in. and shorter +85.0

Setscrews, Square Head, Cup Point, Coarse Thread:
Through 1 in. diam:
6 in. and shorter +5.0
Longer than 6 in. +29.0

RIVETS

F.o.b. Cleveland and/or freight equalized with Pittsburgh, f.o.b. Chicago and/or freight equalized with Birmingham except where equalization is too great.
Structural ¼ in. larger 12.85, 7/16 in. and smaller by 6 in. and shorter: 15% off list.

PRESTRESSED STRAND

(High strength, stress relieved; 7 wire uncoated. Net prices per 1000 ft, 40,000 lb and over)

	Standard Diameter, Inches				
	1/4	5/16	3/8	7/16	1/2
Alton,Ill. L1	$28.95	$43.40	$55.40	$73.00	$95.10
Buffalo W12	28.95	43.40	55.40	73.00	95.10
Cleveland A7	28.95	43.40	55.40	73.00	....
KansasCity,Mo. U3	29.85	43.40	55.40	73.00	95.10
Monessen,Pa. P16	32.15	48.20	61.55	81.10	105.65
NewHaven,Conn. A7	28.95	43.40	55.40	73.00	95.10
Pittsburg,Calif. C11	....	43.40	55.40	73.00	....
Pueblo Colo. W12	28.95	43.40	55.40	73.00	95.10
Roebling,N.J R5	28.95	43.40	55.40	73.00	95.10
SparrowsPoint,Md. B2	28.95	43.40	55.40	73.00	95.10
St Louis L8	28.95	43.40	55.40	73.00	95.10
Waukegan,Ill. A7	28.95	43.40	55.40	73.00	95.10

RAILWAY MATERIALS

	Standard No. 1	Standard No. 2	All No. 2	Tee Rails 60 lb Under
Rails				
Bessemer,Pa. U5	5.75	5.60	....	6.725
Ensley,Aal. T2	5.75	5.65	....	6.725
Fairfield,Ala. T2	....	....	....	....
Gary,Ind. U5	5.75	5.65	....	....
Huntington,W.Va. C15	....	....	....	6.725
Johnstown,Pa. B2	....	....	....	(16)6.725
Lackawanna,N.Y. B2	5.75	5.65	....	6.725
Minnequa,Colo. C10	5.75	5.65	....	7.225
Steelton,Pa. B2	5.75	5.65	....	....
Williamsport,Pa. S19	....	....	....	6.725

TIE PLATES

Fairfield,Ala. T2	6.875
Gary,Ind. U5	6.875
Lackawanna,N.Y. B2	6.875
Minnequa,Colo. C10	6.875
Seattle B3	7.025
Steelton,Pa. B2	6.875
Torrance,Calif C11	6.875

JOINT BARS

Bessemer,Pa. U5	7.25
Fairfield,Ala. T2	7.25
Joliet,Ill. U5	7.25
Lackawanna,N.Y. B2	7.25
Minnequa,Colo. C10	7.25
Steelton,Pa. B2	7.25

AXLES

Ind.Harbor,Ind. S13	9.125
Johnstown,Pa. B2	9.125

TRACK BOLTS, Untreated

Cleveland R2	15.35
KansasCity,Mo. S5	15.35
Lebanon,Pa. B2	15.35
Minnequa,Colo. C10	15.35
Pittsburgh S44	14.75
Seattle B3	15.85

SCREW SPIKES

Lebanon,Pa. B2	15.10

STANDARD TRACK SPIKES

Fairfield,Ala. T2	10.10
Ind.Harbor,Ind. I-2,Y1	10.10
KansasCity,Mo. S5	10.10
Lebanon,Pa. B2	10.10
Minnequa,Colo. C10	10.10
Pittsburgh J5	10.10
Seattle B3	10.60
S.Chicago,Ill. R2	10.10
Struthers,O. Y1	10.10
Youngstown R2	10.10

Footnotes

(1) Chicago base.
(2) Angles, flats, bands.
(3) Merchant.
(4) Reinforcing.
(5) 1⅛ to under 1 7/16 in.; 1 7/16 to under 1 15/16 in., 6.70c; 1 15/16 to 8 in., inclusive, 7.05c.
(6) Chicago or Birm. base.
(7) Chicago base 2 cols. lower.
(8) 16 Ga. and heavier.
(9) Merchant quality; add 0.35c for special quality.
(10) Pittsburgh base.
(11) Cleveland & Pitts. base.
(12) Worcester, Mass., base.
(13) Add 0.25c for 17 Ga. & heavier.
(14) Gage 0.143 to 0.349 in.; for gage 0.142 and lighter, 5.80c.
(15) ⅜" and thinner.
(16) 40 lb and under.
(17) Flats only; 0.25 in. & heavier.
(18) To dealers.
(19) Chicago & Pitts. base.
(21) New Haven, Conn., base.
(22) Deld. San Francisco Bay area.
(23) Special quality.
(24) Deduct 0.05c, finer than 15 Ga.
(25) Bar mill bands.
(26) Deld. in mill zone, 6.295c.
(27) Bar mill sizes.
(28) Bonderized.
(29) Youngstown base.
(30) Sheared; for universal mill add 0.45c
(31) Widths over ⅝ in.; 7.375c, for widths ⅝ in and under by 0.125 in. and thinner.
(32) Buffalo base.
(33) To jobbers, deduct 20c.
(34) 9.60c for cut lengths.
(35) 72" and narrower.
(36) 54" and narrower.
(37) Chicago base, 10 points lower.
(38) 13 Ga. & lighter; 60" & narrower.
(39) 48" and narrower.
(40) Lighter than 0.035"; 0.035" and heavier, 0.25c higher.
(41) 9.10c for cut lengths.
(42) Mill lengths, f.o.b. mill; deld. in mill zone or within switching limits, 5.635c.
(43) 9-14½ Ga.
(44) To fabricators.
(48) 6-7 Ga.
(49) 3½ in. and smaller rounds; 9.65c, over 3½ in. and other shapes.

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This is because Crucible precision-rolls stainless to produce finishes of incomparable lustre. Not only that, Crucible methodically checks each heat to ensure uniform physical properties and accurately controls gauge with electronic measuring devices. For stainless in all gauges down to .010" and in all strip widths, call or write: Crucible Steel Company of America, The Oliver Building, Mellon Square, Pittsburgh 22, Pa.

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Thomson Automatic
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SEAMLESS STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Size—Inches	2		2½		3		3½		4		5		6	
List Per Ft	37c		58.5c		76.5c		92c		$1.09		$1.48		$1.92	
Pounds Per Ft	3.68		5.82		7.62		9.20		10.89		14.81		19.18	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	+12.25	+27.25	+5.75	+22.5	+3.25	+20	+1.75	+18.5	+1.75	+18.5	+2	+18.75	0.5	+16.25
Ambridge, Pa. N2	+12.25	....	+5.75	....	+3.25	....	+1.75	....	+1.75	....	+2	....	0.5	....
Lorain, O. N3	+12.25	+27.25	+5.75	+22.5	+3.25	+20	+1.75	+18.5	+1.75	+18.5	+2	+18.75	0.5	+16.25
Youngstown Y1	+12.25	+27.25	+5.75	+22.5	+3.25	+20	+1.75	+18.5	+1.75	+18.5	+2	+18.75	0.5	+16.25

ELECTRICWELD STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Youngstown B2	+12.25	+27.25	+5.75	+22.5	+3.25	+20	+1.75	+18.5	+1.75	+18.5	+2	+18.75	0.5	+16.25

BUTTWELD STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Size—Inches	⅛		¼		⅜		½		¾		1		1¼	
List Per Ft	5.5c		6c		6c		8.5c		11.5c		17c		22c	
Pounds Per Ft	0.24		0.42		0.57		0.85		1.13		1.68		2.28	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	....	....	....	....	....	....	2.25	+13	5.25	+9	8.75	+4.5	11.25	+3.75
Alton, Ill. L1	....	....	....	....	....	....	0.25	+15	3.25	+11	6.75	+6.5	9.25	+5.75
Benwood, W. Va. W10	1.5	+25	+10.5	+34	+21	+42.5	2.25	+13	5.25	+9	8.75	+4.5	11.25	+3.75
Butler, Pa. F6	4.5	+22	+8.5	+32	+19.5	+41	....	....	....	....	....	....	....	....
Etna, Pa. N2	....	....	....	....	....	....	2.25	+13	5.25	+9	8.75	+4.5	11.25	+3.75
Fairless, Pa. N3	....	....	....	....	....	....	0.25	+15	3.25	+11	6.75	+6.5	9.25	+5.75
Fontana, Calif. K1	....	....	....	....	....	....	+10.75	+26	+7.75	+22	+4.25	+17.5	+1.75	+16.75
Indiana Harbor, Ind. Y1	....	....	....	....	....	....	1.25	+14	4.25	+10	7.75	+5.5	10.25	+6.25
Lorain, O. N3	....	....	....	....	....	....	2.25	+13	5.25	+9	8.75	+4.5	11.25	+3.75
Sharon, Pa. S4	4.5	+22	+8.5	+32	+19.5	+41	....	....	....	....	....	....	....	....
Sharon, Pa. M6	....	....	....	....	....	....	2.25	+13	5.25	+9	8.75	+4.5	11.25	+3.75
Sparrows Pt., Md. B2	2.5	+24	+10.5	+34	+21.5	+43	0.25	+15	3.25	+11	6.75	+6.5	9.25	+5.75
Wheatland, Pa. W9	4.5	+22	+8.5	+32	+19.5	+41	2.25	+13	5.25	+9	8.75	+4.5	11.25	+3.75
Youngstown R2, Y1	....	....	....	....	....	....	2.25	+13	5.25	+9	8.75	+4.5	11.25	+3.75

Size—Inches	1¼		2		2½		3		3½		4	
List Per Ft	27.5c		37c		58.5c		76.5c		92c		$1.09	
Pounds Per Ft	2.72		3.68		5.82		7.62		9.20		10.89	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	11.75	+2.75	12.25	+2.25	13.75	+2.5	13.75	+2.5	3.25	+13.5	3.25	+13.5
Alton, Ill. L1	9.75	+4.75	10.25	+4.25	11.75	+4.5	11.75	+4.5	1.25	+15.5	1.25	+15.5
Benwood, W. Va. W10	11.75	+2.75	12.25	+2.25	13.75	+2.5	13.75	+2.5	3.25	+13.5	3.25	+13.5
Etna, Pa. N2	11.75	+2.75	12.25	+2.25	13.75	+2.5	13.75	+2.5	3.25	+13.5	3.25	+13.5
Fairless, Pa. N3	9.75	+4.75	10.25	+4.25	11.75	+4.5	11.75	+5.5	1.25	+15.5	1.25	+15.5
Fontana, Calif. K1	+1.25	+15.75	+0.75	+15.25	0.75	+15.5	0.75	+15.5	+9.75	+26.5	+9.75	+26.5
Indiana Harbor, Ind. Y1	10.75	+3.75	11.25	+3.25	12.75	+3.5	12.75	+3.5	2.25	+14.5	2.25	+14.5
Lorain, O. N3	11.75	+2.75	12.25	+2.25	13.75	+2.5	13.75	+2.5	....	....	....	....
Sharon, Pa. M6	11.75	+2.75	12.25	+2.25	13.75	+2.5	13.75	+2.5	....	....	....	....
Sparrows Pt., Md. B2	9.75	+4.75	10.25	+4.25	11.75	+4.5	11.75	+4.5	1.25	+15.5	1.25	+15.5
Wheatland, Pa. W9	11.75	+2.75	12.25	+2.25	13.75	+2.5	13.75	+2.5	3.25	+13.5	3.25	+13.5
Youngstown R2, Y1	11.75	+2.75	12.25	+2.25	13.75	+2.5	13.75	+2.5	3.25	+13.5	3.25	+13.5

*Galvanized pipe discounts based on price of zinc at 11.00c, East St. Louis.

Stainless Steel

Representative prices, cents per pound; subject to current lists of extras

AISI Type	Rerolling Ingot	Rerolling Slabs	Forging Billets	H.R. Strip	H.R. Rods; C.F. Wire	Bars; Structural Shapes	Plates	Sheets	C.R. Strip; Flat Wire
201	22.75	25.00	....	36.00	....	42.50	39.25	48.50	45.00
202	24.75	26.25	37.75	39.00	42.25	44.50	40.00	49.25	49.25
301	24.00	26.00	38.75	37.25	43.50	46.00	41.25	51.25	47.50
302	26.25	29.50	39.50	40.50	44.25	46.75	42.25	52.00	52.00
302B	26.50	30.75	42.25	45.75	46.75	49.00	44.50	57.00	57.00
303	....	33.25	42.50	....	47.25	49.75	45.00	56.75	56.75
304	28.00	31.25	42.00	43.75	47.00	49.50	45.75	55.00	55.00
304L	....	....	49.75	51.50	54.75	57.25	53.50	62.75	62.75
305	29.50	34.75	44.00	47.50	47.00	49.50	46.25	58.75	58.75
308	32.00	36.25	49.00	50.25	54.75	57.75	55.25	63.00	63.00
309	41.25	47.50	60.00	64.50	66.25	69.50	66.00	80.50	80.50
310	51.50	59.50	81.00	84.25	89.75	94.50	87.75	96.75	96.75
314	....	....	80.50	....	89.75	94.50	87.75	....	104.25
316	41.25	47.50	64.50	68.50	71.25	75.75	71.75	80.75	80.75
316L	....	....	72.25	76.25	79.50	83.50	79.50	88.50	88.50
317	49.75	58.00	79.75	88.25	89.50	94.25	88.50	101.00	101.00
321	33.50	38.00	48.75	53.50	54.50	57.50	54.75	65.00	65.50
330	....	....	123.25	....	113.00	143.75	135.00	149.25	149.25
18-8 CbTa	38.50	48.25	57.75	63.50	63.75	67.25	64.75	79.25	79.25
403	....	....	29.25	....	33.25	35.00	30.00	40.25	40.25
405	20.25	26.50	30.75	36.00	34.75	36.50	32.50	46.75	46.75
410	17.50	19.50	29.25	31.00	33.25	35.00	30.00	40.25	40.25
416	....	....	29.75	....	33.75	35.50	31.25	48.25	48.25
420	....	31.50	35.50	41.75	40.75	42.75	40.25	62.00	62.00
430	17.75	19.75	29.75	32.00	33.75	35.50	31.00	40.75	40.75
430F	....	....	30.50	....	34.25	36.00	31.75	51.75	51.75
431	....	29.75	39.25	....	43.50	46.00	41.00	56.00	56.00
446	....	....	40.75	59.00	46.00	48.25	42.75	70.00	70.00

Producers Are: Allegheny Ludlum Steel Corp.; American Steel & Wire Div., U. S. Steel Corp.; Anchor Drawn Steel Co., division of Vanadium-Alloys Steel Co.; Armco Steel Corp.; Babcock & Wilcox Co.; Bethlehem Steel Co.; J. Bishop & Co.; A. M. Byers Co.; Calstrip Steel Corp.; G. O. Carlson Inc.; Carpenter Steel Co.; Carpenter Steel Co. of New England; Charter Wire Products; Crucible Steel Co. of America; Damascus Tube Co.; Dearborn Div., Sharon Steel Corp.; Wilbur B. Driver Co.; Driver-Harris Co.; Eastern Stainless Steel Corp.; Firth Sterling Inc.; Fort Wayne Metals Inc.; Green River Steel Corp., subsidiary of Jessop Steel Co.; Indiana Steel & Wire Co.; Ingersoll Steel Div., Borg-Warner Corp.; Ellwood Ivins Steel Tube Works Inc.; Jessop Steel Co.; Johnson Steel & Wire Co. Inc.; Stainless & Strip Div., Jones & Laughlin Steel Corp.; Joslyn Stainless Steels, division of Joslyn Mfg. & Supply Co.; Latrobe Steel Co.; Lukens Steel Co.; Maryland Fine & Specialty Wire Co. Inc.; McLouth Steel Corp.; Metal Forming Corp.; Midvale-Heppenstall Co.; National Standard Co.; National Tube Div., U. S. Steel Corp.; Pacific Tube Co.; Page Steel & Wire Div., American Chain & Cable Co. Inc.; Pittsburgh Rolling Mills Inc.; Republic Steel Corp.; Riverside-Alloy Metal Div., H. K. Porter Company Inc.; Rodney Metals Inc.; Sawhill Tubular Products Inc.; Sharon Steel Corp.; Simonds Saw & Steel Co.; Specialty Wire Co. Inc.; Standard Tube Co.; Superior Steel Div., Copperweld Steel Co.; Superior Tube Co.; Swepco Tube Corp.; Techalloy Co. Inc.; Timken Roller Bearing Co.; Trent Tube Co., subsidiary of Crucible Steel Co. of America; Tube Methods Inc.; Ulbrich Stainless Steel Inc.; Union Steel Corp.; U. S. Steel Corp.; Universal Cyclops Steel Corp.; Vanadium-Alloys Steel Co.; Wall Tube & Metal Products Co.; Wallingford Steel, subsidiary, Allegheny Ludlum Steel Corp.; Washington Steel Corp.; Seymour Mfg. Co.

Clad Steel

	Plates: 5% Carbon Base	Plates: 10% Carbon Base	Plates: 15% Carbon Base	Plates: 20% Carbon Base	Sheets: 20% Carbon Base
Stainless					
302	....	....	....	....	37.50
304	26.05	28.80	31.55	34.30	39.75
304L	30.50	33.75	36.95	40.15	....
316	38.20	42.20	46.25	50.25	58.25
316L	42.30	46.75	51.20	55.65	....
316 Cb	49.90	55.15	60.40	65.65	....
321	31.20	34.50	37.75	41.05	47.25
347	36.90	40.80	44.65	48.55	57.00
405	22.25	24.60	26.90	29.25	....
410	20.55	22.70	24.85	27.00	....
430	21.20	23.45	25.65	27.90	....
Inconel	48.90	59.55	70.15	80.55	....
Nickel	41.65	51.95	63.30	72.70	....
Nickel, Low Carbon	41.95	52.60	63.30	74.15	....
Monel	43.35	53.55	63.80	74.05	....

	Strip, Carbon Base, Cold Rolled: 10%	Strip, Carbon Base, Cold Rolled: Both Sides
Copper*	$35.85	$42.50

*Deoxidized. Production points: Stainless-clad sheets, New Castle, Ind. I-4; stainless-clad plates, Claymont, Del. C22, Coatesville, Pa. L7, New Castle, Ind. I-4, and Washington, Pa. J3; nickel, inconel, monel-clad plates, Coatesville L7; copper-clad strip, Carnegie, Pa. S18.

Tool Steel

Grade	$ per lb	Grade	$ per lb
Reg. Carbon (W-1)	0.330	V-Cr Hot Work (H-13)	0.550
Spec. Carbon (W-1)	0.385	W-Cr Hot Work (H-12)	0.530
Oil Hardening (O-1)	0.505	W Hot Wk. (H-21)	1.425-1.44
V-Cr Hot Work (H-11)	0.505	Hi-Carbon-Cr (D-11)	0.955

Grade by Analysis (%) W	Cr	V	Co	Mo	AISI Designation	$ per lb
18	4	1	....	....	T-1	1.840
18	4	2	....	....	T-2	2.005
13.5	4	3	....	....	T-3	2.105
18.25	4.25	1	4.75	....	T-4	2.545
18	4	2	9	....	T-5	2.915
20.25	4.25	1.6	12.95	....	T-6	4.330
13.75	3.75	2	5	....	T-8	2.485
1.5	4	1	....	8.5	M-1	1.200
6.4	4.5	1.9	....	5	M-2	1.345
6	4	3	....	6	M-3	1.590

Tool steel producers include: A4, A8, B2, B6, C4, C9, C12, C18, F2, J3, L3, M14, S8, U4, V2, and V3.

Pig Iron

F.o.b. furnace prices in dollars per gross ton, as reported to STEEL. Minimum delivered prices are approximate.

	Basic	No. 2 Foundry	Malle-able	Besse-mer
Birmingham District				
Birmingham R2	62.00	62.50**	....	....
Birmingham U6	....	62.50**	66.50	....
Woodward, Ala. W15	62.00*	62.50**	66.50	....
Cincinnati, deld.	....	70.20	....	....
Buffalo District				
Buffalo H1, R2	66.00	66.50	67.00	67.50
N. Tonawanda, N.Y. T9	....	66.50	67.00	67.50
Tonawanda, N.Y. W12	66.00	66.50	67.00	67.50
Boston, deld.	77.29	77.79	78.29	....
Rochester, N.Y., deld.	69.02	69.52	70.02	....
Syracuse, N.Y., deld.	70.12	70.62	71.12	....
Chicago District				
Chicago I-3	66.00	66.50	66.50	67.00
S. Chicago, Ill. R2	66.00	66.50	66.50	67.00
S. Chicago, Ill. W14	66.00	....	66.50	67.00
Milwaukee, deld.	69.02	69.52	69.52	70.02
Muskegon, Mich., deld.	....	74.52	74.52	....
Cleveland District				
Cleveland R2 A7	66.00	66.50	66.50	67.00
Akron, Ohio deld.	69.52	70.02	70.02	70.52
Mid-Atlantic District				
Birdsboro, Pa. B10	68.00	68.50	69.00	69.50
Chester, Pa P4	68.00	68.50	69.00	....
Swedeland, Pa. A3	68.00	68.50	69.00	69.50
New York, deld	....	75.50	76 00	....
Newark, N.J. deld.	72.69	73.19	73.69	74.19
Philadelphia, deld.	70.41	70.91	71.41	71.99
Troy, N.Y. R2	68.00	68.50	69.00	69.50
Pittsburgh District				
Neville Island, Pa. P6	66.00	66.50	66.50	67.00
Pittsburgh (N&S sides), Aliquippa, deld.	....	67.95	67.95	68.48
McKees Rocks, Pa., deld.	....	67.60	67.60	68.13
Lawrenceville, Homestead, Wilmerding Monaca, Pa., deld.	....	68.26	68.26	69.79
Verona, Trafford, Pa deld.	68.29	68.82	68.82	69.35
Brackenridge, Pa., deld.	68.60	69.10	69.10	69.63
Midland, Pa. C18	66.00	....	....	....
Youngstown District				
Hubbard, Ohio Y1	....	....	66.50	....
Sharpsville, Pa. S6	66.00	....	66.50	67.00
Youngstown Y1	....	....	66.50	....
Mansfield, Ohio, deld.	71.30	....	71.80	72.30

	Basic	No. 2 Foundry	Malle-able	Besse-mer
Duluth I-3	66.00	66.50	66.50	67.00
Erie, Pa. I-3	66.00	66.50	66.50	67.00
Everett, Mass. E1	67.50	68.00	68.50	....
Fontana, Calif. K1	75.00	75.50	....	....
Geneva, Utah C11	66.00	66.50	....	....
Granite City, Ill. G4	67.90	68.40	68.90	....
Ironton, Utah C11	66.00	66.50	....	....
Minnequa, Colo C10	68.00	68.50	69.00	....
Rockwood, Tenn. T3	....	62.50‡	66.50	....
Toledo, Ohio I-3	66.00	66.50	66.50	67.00
Cincinnati, deld.	72.94	73.44	....	....

*Phos. 0.70-0.90%; Phos. 0.30-0.69%, $63.
**Phos. 0.70-0.90%; Phos. 0.30-0.69%, $63.50.
‡Phos. 0.50% up; Phos. 0.30-0.49%, $63.50.

PIG IRON DIFFERENTIALS

Silicon: Add 75 cents per ton for each 0.25% Si or percentage thereof over base grade, 1.75-2.25%, except on low phos. iron on which base is 1.75-2.00%.

Manganese: Add 50 cents per ton for each 0.25% manganese over 1% or portion thereof.

BLAST FURNACE SILVERY PIG IRON, Gross Ton

(Base 6.01-6.50% silicon; add 75c for each 0.50% silicon or portion thereof over the base grade within a range of 6.50 to 11.50%; starting with silicon over 11.50% add $1.50 per ton for each 0.50% silicon or portion thereof up to 14%; add $1 for each 0.50% Mn over 1%)

Jackson, Ohio I-3, J1	$78.00
Buffalo H1	79.25

ELECTRIC FURNACE SILVERY IRON, Gross Ton

(Base 14.01-14.50% silicon; add $1 for each 0.5% Si to 18%; $1.25 for each 0.50% Mn over 1%; $2 per gross ton premium for 0.045% max P)

Calvert City, Ky. P15	$99.00
Niagara Falls, N.Y. P15	99.00
Keokuk, Iowa Open-hearth & Fdry. K2	89.00
Keokuk, Iowa O.H. & Fdry. 12½ lb piglet, 16% Si, K2	92.00

LOW PHOSPHORUS PIG IRON, Gross Ton

Lyles, Tenn. T3 (Phos. 0.035% max)	$73.00
Rockwood Tenn. T3 (Phos. 0.035% max)	73.00
Troy, N.Y. R2 (Phos. 0.035% max)	73.00
Philadelphia, deld.	81.67
Cleveland A7 (Intermediate) (Phos. 0.036-0.075% max)	71.00
Duluth I-3 (Intermediate) (Phos. 0.036-0.075%)	71.00
Erie, Pa. I-3 (Intermediate) (Phos. 0.036-0.075% max)	71.00
Neville Island, Pa. P6 (Intermediate) (Phos. 0.036-0.075% max)	71.00

Steel Service Center Products

Representative prices, per pound, subject to extras, f.o.b. warehouse. City delivery charges are 15 cents per 100 lb except: Denver, Moline, Norfolk, Richmond, Washington, 20 cents; Baltimore, Boston, Los Angeles, New York, Philadelphia, Portland, Spokane, San Francisco, 10 cents; Atlanta, Birmingham, Chattanooga, Houston, Seattle, no charge.

	SHEETS				STRIP	BARS			Standard Structural Shapes	PLATES	
	Hot-Rolled	Cold-Rolled	Galv. 10 Ga.†	Stainless Type 302	Hot-Rolled*	H.R. Rounds	C.F. Rds.‡	H.R. Alloy 4140††[5]		Carbon	Floor
Atlanta	8.59§	9.86§	10.13	....	8.91	9.39	13.24 #	....	9.40	9.29	11.21
Baltimore	8.55	9.25	9.99	....	9.05	9.45	11.85 #	15.48	9.55	9.00	10.50
Birmingham	8 18	9.45	10.46	....	8.51	8.99	....	....	9 00	8.89	10.90
Boston	10.07	11.42	11.92	53.50	12.17	10.19	13.30 #	15.64	10.64	10.27	11.95
Buffalo	8.40	9.60	10.85	55.98	8.75	9.15	11.45 #	15.40	9.25	9.20	10.75
Chattanooga	8.35	9.69	9.65	....	8.40	8.77	10.46	....	8.88	8.80	10.66
Chicago	8.25	9.45	10.90	53.00	8.51	8.99	9.15	15.05	9.00	8.89	10.20
Cincinnati	8.43	9.51	10.95	53.43	8.83	9.31	11.58 #	15.37	9.56	9.27	10.53
Cleveland	8.54[a]	8.79[b]	10.87[a]	52.33	10.32[c]	8.75[d]	11.25 #	15.16	9.39	8.71[e]	10.50[f]
Dallas	8.80	9.30	....	....	8.85	8.80	....	....	8.75	9.15	10.40
Denver	9.40	11.84	12.94	....	9.43	9.80	11.19	....	9.84	9.76	11.08
Detroit	8.51	9.71	11.25	56.50	8.88	9.30	9.51	15.33	9.56	9.26	10.46
Erie, Pa.	8.35	9.45	9.95[10]	....	8.60	9.10	11.25	....	9.35	9.10	10.60
Houston	8.40	8.90	10.29	52.00	8.45	8.40	11.60	15.75	8.35	8.75	10.10
Jackson, Miss.	8.52	9.79	....	....	8.84	9.82	10.68	....	9.33	9.22	11.03
Los Angeles	8.70[2]	10.80[2]	12.20	57.60	9.15	9.10[2]	12.95[2]	16.35	9.00[2]	9.10[2]	11.30[2]
Memphis, Tenn.	8.59	9.80	....	....	8.84	9.32	11.25 #	....	9.33	9.22	10.86
Milwaukee	8.39	9.59	11.04	....	8.65	9.13	9.39	15.19	9.22	9.03	10.34
Moline, Ill.	8.55	9.80	....	....	8.84	8.95	9.15	....	8.99	8.91	....
New York	9.17	10.49	11.30	53.08	9.64	9.99	13.25 #	15.50	9.74	9.77	11.05
Norfolk, Va.	8.65	....	....	....	9.15	9.30	12.75	....	9.65	9.10	10.50
Philadelphia	8.20	9.55	10.61	52.71	9.25	9.40	11.95 #	15.48	9.10	9.15	10.40**
Pittsburgh	8.54[a]	8.79[b]	10.76[a]	52.33	10.30[c]	8.64[d]	11.25 #	15.05	9.00	8.47[e]	10.26[f]
Richmond, Va.	8.65	....	10.79	....	9.15	9.55	....	....	9.65	9.10	10.60
St. Louis	8.63	9.83	11.28	....	8.89	9.37	9.78	15.43	9.48	9.27	10.58
St. Paul	8.79	10.04	11.49	....	8.84	9.21	9.86	....	9.38	9.30	10.49
San Francisco	9.65	11 10	11.40	55.10	9.75	10.15	13.60	16.25	9.85	10.00	12.35
Seattle	10.30	11.55	12.50	56.52	10.25	10.50	14.70	16.80[2]	10.20	10.10	12.50
South'ton, Conn.	9.07	10.33	10.71	....	9.48	9.74	....	....	9.57	9.57	10.91
Spokane	10.30	11.55	12.50	57.38	10.75	11.00	14.70	16.80	10.20	10.10	13.00
Washington	9.15	....	....	....	9.65	10.05	12.50	....	10.15	9.60	11.10

*Prices do not include gage extras; †prices include gage and coating extras; ‡includes 35-cent bar quality extras; §42 in. and under; **⅛ in. and heavier; ††as annealed; ‡‡¾ in. to 4 in. wide, inclusive; #net price, 1 in. round C-1018.

[a]10 Ga.; [b]20 Ga.; [c]¼ x 1 in.; [d]⅜-2½ in.; [e]¼ x 84 in.; [f]¼ x 36.

Base quantities, 2000 to 4999 lb except as noted; cold-finished bars, 2000 lb and over except in Seattle, 2000 to 3999 lb; stainless sheets, 8000 lb except in Chicago, New York, Boston, Seattle, 10,000 lb and in San Francisco, 2000 to 4999 lb; hot-rolled products on West Coast, 2000 to 9999 lb, except in Seattle, 30,000 lb and over; [2]—30,000 lb; [5]—1000 to 4999 lb; [5]—1000 to 1999 lb; [10]—2000 lb and over.

Refractories

Fire Clay Brick (per 1000 pieces*)

High-Heat Duty: Ashland, Grahn, Hayward, Hitchens, Haldeman, Olive Hill, Ky., Athens, Troup, Tex. Beech Creek, Clearfield, Curwensville, Lock Haven, Lumber, Orviston, West Decatur, Winburne, Snow Shoe, Pa., Bessemer, Ala., Farber, Mexico, St. Louis, Vandalia, Mo., Ironton, Oak Hill, Parrall, Portsmouth, Ohio, Ottawa, Ill., Stevens Pottery, Ga., Canon City, Colo., $140; Salina, Pa., $145; Niles, Ohio, $138; Cutler, Utah, $175.

Super-Duty: Ironton, Ohio, Vandalia, Mo., Olive Hill, Ky., Clearfield, Salina, Winburne, Snow Shoe, Pa., New Savage, Md., St. Louis, $185; Stevens Pottery, Ga., $195; Cutler, Utah, $248.

Silica Brick (per 1000 pieces*)

Standard: Alexandria, Claysburg, Mt. Union, Sproul, Pa., Ensley, Ala., Pt. Matilda, Pa., Portsmouth, Ohio, Hawstone, Pa., St. Louis, $158; Warren, Niles, Windham, Ohio, Hays, Latrobe, Morrisville, Pa., $163; E. Chicago, Ind., Joliet, Rockdale, Ill., $168; Canon City, Colo., $173; Lehi, Utah, $183; Los Angeles, $185.

Super-Duty: Sproul, Hawstone, Pa., Niles, Warren, Windham, Ohio, Leslie, Md., Athens, Tex., $158; Morrisville, Hays, Latrobe, Pa., $163; E. Chicago, Ind., St. Louis, $168; Canon City, Colo., $183; Curtner, Calif., $185.

Semisilica Brick (per 1000 pieces*)

Woodbridge, N. J., Canon City, Colo., $140; Philadelphia, Clearfield, Pa., $145.

Ladle Brick (per 1000 pieces*)

Dry Pressed: Aisey, Ill., Chester, New Cumberland, W. Va., Freport, Johnstown, Merrill Station, Vanport, Pa., Mexico, Vandalia, Mo., Wellsville, Irondale, New Salisbury, Ohio, $96.75; Clearfield, Pa., Portsmouth, Ohio, $102.

High-Alumina Brick (per 1000 pieces*)

50 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., Danville, Ill., $253; Philadelphia, $265; Clearfield, Pa., $230; Orviston, Snow Shoe Pa., $260.

60 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., $310; Danville, Ill., $313; Clearfield, Orviston, Snow Shoe, Pa., $320; Philadelphia, $325.

70 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., $350; Danville, Ill., $353; Clearfield, Orviston, Snow Shoe, Pa., $360; Philadelphia, $365.

Sleeves (per 1000)

Reesdale, Johnstown, Bridgeburg, St. Charles, Pa., St. Louis, $188; Ottawa, Ill., $205.

Nozzles (per 1000)

Reesdale, Johnstown, Bridgeburg, St. Charles, Pa., St. Louis, $310.

Runners (per 1000)

Reesdale, Johnstown, Bridgeburg, St. Charles, Pa., $234.

Dolomite (per net ton)

Domestic, dead-burned, bulk, Billmeyer, Blue Bell, Williams, Plymouth Meeting, York, Pa., Millville, W. Va., Bettsville, Millersville, Martin, Woodville, Gibsonburg, Narlo, Ohio, $16.75; Thornton, McCook, Ill., $17; Dolly Siding, Bonne Terre, Mo., $15.60.

Magnesite (per net ton)

Domestic, dead-burned, ½ in. grains with fines: Chewelah, Wash., Luning, Nev., $46; ⅝ in. grains with fines: Baltimore, $73.

*—9 in. x 4½ x 2.50 sts.

Fluorspar

Metallurgical grades, f.o.b. shipping point in Ill., Ky., net tons, carloads, effective CaF_2 content 72.5%, $37-$41; 70%, $36-$40; 60%, $33-$36.50. Imported, net ton, f.o.b. cars point of entry, duty paid, metallurgical grade; European, $30-$33, contract; Mexican, all rail, duty paid, $25; barge, Brownsville, Tex., $27.

Canadian Steel

(Cents per pound, f.o.b. mill, except as otherwise noted)

Billets, Blooms & Slabs:

Carbon, Forging Quality (net ton)	$97.00
Alloy (net ton)	115.00

Wire Rods:

Carbon, $\frac{7}{32}$" to under ¼ in.	5.30
Carbon, ¼ in. to 47/64 in.	5.70
Alloy	6.40
Wire (carload lots)	8.40

Bars & Small Shapes:

Carbon, merchant quality	5.40
Carbon, special quality	5.85
Alloy	6.40

Bar Mill Bands:

Carbon	5.40
Alloy	8.05

Structural Size Angles & Zees 5.40

Plates:

Carbon	5.45

Sheets & Coils, Hot Rolled:

Carbon Sheets	5.00
Carbon Strip	5.00

Sheets & Coils, Cold Rolled:

Carbon Sheets	6.35
Carbon Strip (0.080 and lighter)	6.35
Carbon Strip (0.081 and heavier)	6.65

Sheets & Coils, Galvanized:

Standard Quality	6.70
Culvert Quality	7.00
Sheets, Porcelain Enameling	7.45

Sheets & Coils, Electrical:

Field Grade	9.00
Armature Grade	9.50
Electrical Grade	10.15
Tin Mill Products (Per Base Box; 100 lb basis wt)	
Coke Tin Plate (1.25 lb pot yield)	$10.60
Electrolytic Tin Plate (0.25 lb coating)	9.10
Black Plate	8.30
Nails, c.l. lots, 400 keg min. (per keg)	$8.15

Metal Powder

(Per pound f.o.b. shipping point in ton lots for minus 100 mesh, except as noted)

	Cents
Sponge Iron, domestic and foreign, 98% Fe, min. trucklots, freight allowed east of Mississippi River:	
100 mesh, bags	11.25
100 mesh, pails	9.10§
40 mesh, bags	8.10††
Electrolytic Iron,	
Melting stock, 99.87% Fe, irreg. fragments, ⅛ in. x 1.3 in.	28.75
1.3 in.	28.75
(In contract lots of 240 tons price is 22.75c)	
Annealed, 99.5% Fe	36.50
Unannealed (99+% Fe)	36.00
Unannealed (99+% Fe) (minus 325 mesh)	59.00
Powder Flake (minus 16 plus 100 mesh)	29.00
Carbonyl Iron:	
98.1-98.9%, 3 to 20 microns, depending on grade, 93.00-290.00 in standard 200-lb containers; all minus 200 mesh.	
Aluminum:	
Atomized, 500-lb drum, freight allowed, c.l. 38.50; ton lots 40.50	
Antimony, 500-lb lots	42.00*
Brass, 5000-lb lots	*34.20-50.70†*
Bronze, 5000-lb lots	*52.10-56.10†*
Copper, electrolytic	14.25*
Copper, reduced	14.25*
Lead	7.50*
Manganese, Electrolytic: Minus 50 mesh	43.00
Nickel	80.60
Nickel-Silver, 5000-lb lots	*52.70-57.10†*
Phosphor-Copper, 5000-lb lots	*64.50*
Copper (atomized) 5000-lb lots	*45.00-53.50*
Solder	7.00*
Stainless Steel, 304	$0.89
Stainless Steel, 316	$1.07
Tin	14.00*
Zinc, 5000-lb lots	*19.20-32.40‡*
Tungsten:	Dollars
Carbon reduced, 98.8% min, minus 65 mesh	nom**
Chromium, electrolytic 99.8% Cr, min. metallic basis	5.00

*Plus cost of metal. †Depending on composition. ‡Depending on mesh. § Cutting and scrafing grade. **Depending on price of ore. ††Welding grade.

Ores

Lake Superior Iron Ore

(Prices effective at start of the 1959 shipping season, subject to later revision, gross ton, 51.50% iron natural, rail of vessel, lower lake ports.)

Mesabi bessemer	$11.60
Mesabi nonbessemer	11.45
Old Range bessemer	11.85
Old Range nonbessemer	11.70
Open-hearth lump	12.70
High phos	11.45

The foregoing prices are based on upper lake rail freight rates, lake vessel freight rates, handling and unloading charges, and taxes thereon, which were in effect Jan. 1, 1959, and increases or decreases after that date are absorbed by the seller.

Eastern Local Iron Ore

Cents per unit, deld. E. Pa.

New Jersey, concentrates	nom.

Foreign Iron Ore

Cents per unit, c.i.f. Atlantic ports

Swedish basic, 65%	21.00
Brazilian iron ore, 68.5%	22.60

Tungsten Ore

Net ton, unit

Foreign wolframite, good commercial quality	15.00*
Domestic, concentrates f.o.b. milling points	16.00-17.00†

*Before duty. †Nominal.

Manganese Ore

Mn 46-48%, Indian 91.5c-96.5c, nom. per long ton unit, c.i.f. U. S. ports, duty for buyer's account.

Chrome Ore

Gross ton, f.o.b. cars New York, Philadelphia, Baltimore, Charleston, S. C., plus ocean freight differential for delivery to Portland, Oreg., Tacoma, Wash.

Indian and Rhodesian

48% 3:1	$42.00-44.00†
48% 2.8:1	38.00-40.00†
48% no ratio	29.00-31.00†

South African Transvaal

44% no ratio	19.75-21.00
48% no ratio	29.00-31.00

Turkish

48% 3:1	51.00-55.00†

Domestic

Rail nearest seller

18% 3:1	39.00

Molybdenum

Sulfide concentrate, per lb of Mo content, mines, unpacked	$1.23

Antimony Ore

Per short ton unit of Sb content, c.i.f. seaboard

50-55%	$2.25-2.40
60-65%	2.50-3.10

Vanadium Ore

Cents per lb V_2O_5

Domestic	31.00

†Nominal.

Metallurgical Coke

Price per net ton

Beehive Ovens

Connellsville, Pa., furnace	$14.75-15.25
Connellsville, Pa., foundry	18.00-18.50

Oven Foundry Coke

Birmingham, ovens	$30.35
Cincinnati, deld.	33.34
Buffalo, ovens	32.00
Detroit, ovens	32.00
Pontiac, Mich., deld.	33.95
Saginaw, Mich., deld.	35.53
Erie, Pa., ovens	32.00
Everett, Mass., ovens: New England, deld	33.55*
Indianapolis, ovens	31.25
Ironton, Ohio, ovens	30.50
Cincinnati, deld.	33.54
Kearny, N. J., ovens	31.25
Milwaukee, ovens	32.00
Neville Island (Pittsburgh), Pa., ovens	30.75
Painesville, Ohio, ovens	32.00
Cleveland, deld.	34.19
Philadelphia, ovens	31.00
St. Louis, ovens	33.00
St. Paul, ovens	31.25
Chicago, deld.	34.68
Swedeland, Pa., ovens	31.00
Terre Haute, Ind., ovens	31.25

*Within $5.15 freight zone from works.

Imported Steel

(Base per 100 lb, landed, duty paid; based on current ocean rates with any rise for buyer's acc't. Source of shipment: Western Europe)

	North Atlantic	Great Lakes	South Atlantic	Gulf Coast	West Coast
Deformed Bars, Intermediate, ASTM-A 305	$6.13	$6.13	$6.08	$5.98	$6.44
Bar Size Angles	6.13	6.13	6.08	5.98	6.44
Structural Angles	6.03	6.03	5.98	5.88	6.28
I-Beams	6.03	6.03	5.98	5.88	6.28
Channels	6.03	6.03	5.98	5.88	6.28
Plates (basic bessemer)	5.87	....	5.87	5.77	6.17
Sheets, H.R.	7.00	7.00	6.95	6.85	7.25
Sheets, Galvanized 20 Ga., 36 in. x 96 in.	9.30	9.30	9.25	9.15	9.65
Sheets, Galv. (in coils) 20 Ga., 48 in. wide	9.45	9.45	9.40	9.30	9.70
Sheets, C.R. (drawing quality)	8.50	8.50	8.45	8.35	8.75
Furring Channels, C.R., 1000 ft, ⅞ x 0.30 lb per ft	25.22	25.06	24.91	24.61	26.28
Barbed Wire (†)	7.15	7.15	7.10	7.00	7.40
Merchant Bars	6.18	6.18	6.13	6.03	6.43
Hot-Rolled Bands	6.00	6.00	5.95	5.85	6.25
Wire Rods, Thomas Commercial No. 5	6.10	6.15	6.10	6.00	6.35
Wire Rods, O.H.	6.65	6.70	6.65	6.55	6.90
Bright Common Wire Nails (§)	7.65	7.65	7.60	7.50	7.90

†Per 82 lb net reel. §Per 100-lb kegs, 20d nails and heavier.

Coal Chemicals

(Representative prices)

Cents per gal f.o.b. tank cars or tank trucks, plant.	
Pure benzene	31.00
Xylene, industrial grade	29.00
Creosote	24.00
Naphthalene, 78 deg	5.00
Toluene one deg (del. east of Rockies)	25.00
Cents per lb, f.o.b. tank cars or tank trucks, deld.	
Phenol, 90 per cent grade	14.75
Per net ton bulk, f.o.b. cars or trucks, plant	
Ammonium sulfate, regular grade	$32.00

Ferroalloys

MANGANESE ALLOYS

Spiegeleisen: Carlot, per gross ton, Palmerton, Neville Island, Pa. 21-23% Mn, $105; 19-21% Mn, 1-3% Si, $102.50; 16-19% Mn, $100.50.

Standard Ferromanganese: (Mn 74-76%, C 7% approx) base price per net ton, $245, Johnstown, Duquesne, Sheridan, Neville Island, Pa.; Alloy, W. Va.; Ashtabula, Marietta, O.; Sheffield, Ala.; Portland, Oreg. Add or subtract $2 for each 1% or fraction thereof of contained manganese over 76% or under 74%, respectively (Mn 79-81%). Lump $253 per net ton, f.o.b. Anaconda or Great Falls, Mont. Add $2.60 for each 1% above 81%; subtract $2.60 for each 1% below 79%, fractions in proportion to nearest 0.1%.

High-Grade Low-Carbon Ferromanganese: (Mn 85-95%). Carload, lump, bulk, max 0.07% C, 35.1c per lb of contained Mn, carload packed 38.4c, ton lots 37.9c, less ton 39.1c. Delivered. Deduct 1.5c for max 0.15% C grade from above prices, 3c for max 0.03% C, 3.5c for max 0.5% C, and 6.5c for max 75% C—max 7% Si. **Special Grade:** (Mn 90% min, C 0.07% max, P 0.06% max). Add 2.05c to the above prices. Spot, add 0.25c.

Medium-Carbon Ferromanganese: (Mn 80-85%, C 1.25-1.5%, Si 1.5% max). Carload, lump, bulk, 25.5c per lb of contained Mn; packed, carload 28.8c, ton lot 28.4c, less ton 29.6c.

Electrolytic Manganese Metal: Min carload, bulk, 33.25c; 2000 lb to min carload 36c; less ton, 38c; 50 lb cans, add 0.5c per lb. Premium for hydrogen-removed metal, 0.75c per lb. Prices are f.o.b. cars, Knoxville, Tenn., freight allowed to St. Louis or any point east of Mississippi River; or f.o.b. Marietta, O., freight allowed.

Silicomanganese: (Mn 65-68%). Carload, lump, bulk, 1.50% C grade, 18.5-21% Si, 12.8c per lb of alloy. Packed, c.l. 14c, ton 14.45c, less ton 15.45c, f.o.b. Alloy, W. Va.; Ashtabula, Marietta, O.; Sheffield, Ala.; Portland, Oreg. For 2% C grade, Si 16-18.5%, deduct 0.2c from above prices. For 3% grade, Si 12.5-16%, deduct 0.4c from above prices. Spot, add 0.25c.

TITANIUM ALLOYS

Ferrotitanium, Low-Carbon: (Ti 20-25%, Al 3.5% max, Si 4% max, C 0.10% max). Contract, ton lot, 2" x D, $1.50 per lb of contained Ti; less ton to 300 lb, $1.55. (Ti 38-43%, Al 8% max, Si 4% max, C 0.10% max). Ton lot $1.35, less ton to 300 lb $1.37, f.o.b. Niagara Falls, N. Y., freight allowed to St. Louis.

Ferrotitanium, High-Carbon: (Ti 15-18%, C 6-8%). Contract min c.l. $250 per ton, f.o.b. Niagara Falls, N. Y., freight allowed to destinations east of Mississippi River and north of Baltimore and St. Louis. Spot, $255.

Ferrotitanium, Medium-Carbon: (Ti 17-21%, C 2-4%). Contract, c.l. $300 per ton, f.o.b. Niagara Falls, N. Y., freight not exceeding St. Louis rate allowed. Spot, $305.

CHROMIUM ALLOYS

High-Carbon Ferrochrome: C.l. lump, bulk, 28.75c per lb of contained Cr. Delivered.

Charge Chrome 1: Cr 63%, C 6% max, Si 7% max, 22c. **Charge Chrome 2:** Cr 50-59%, C 8% max, Si 6% max, 23c. Carload, lump, bulk, per lb Cr.

Refined Chrome 1: Cr 50-59%, C 5% max, Si 2% max, 25c. **Refined Chrome 2:** Si 12% max, 24c. Carload, lump, bulk, per lb Cr.

Low-Carbon Ferrochrome: Cr 63-66% (Simplex), carload, lump, bulk, C 0.025% max, 36.75c per lb contained Cr; 0.010% max, 37.75c. Delivered.

Cr 67-71%, carload, lump, bulk, 0.025% max, 39.75c; 0.05% max, 39.00c; 0.10% max, 38.50c; 0.20% max, 38.25c; 0.50% max, 38.00c; 1.0% max, 37.75c; 1.5% max, 37.50c; 2.0% max, 37.25c. Delivered.

Foundry Ferrochrome, High-Carbon: (Cr 62-66%, C 5-7%, Si 7-10%). C.l., 2" x D, bulk 30.8c per lb of contained Cr. Packed, c.l. 32.4c, ton 34.2c, less ton 35.7c. Delivered. Spot, add 0.25c.

Foundry Ferrosilicon Chrome: (Cr 50-54%, Si 28-32%, C 1.25% max). 8M x D, carload, bulk, 20.05c per lb of alloy, carload packed, 21.25c, ton lot 22.50c, less ton lot 23.70c. Delivered. Spot, add 0.25c.

Ferrochrome-Silicon: Cr 39-41%, Si 42-45%, C 0.05% max or Cr 33-36%, Si 45-48%, C 0.05% max. Carload, lump, bulk, 3" x down and 2" x down, 28.25c per lb contained Cr, 14.60c per lb contained Si, 0.75" x down 29.40c per lb contained Cr, 14.60c per lb contained Si.

Chromium Metal, Electrolytic: Commercial grade (Cr 99.8% min, metallic basis, Fe 0.2% max). Contract, carlot, packed, 2" x D plate (about ⅛" thick) $1.15 per lb, ton lot $1.17, less ton lot $1.19. Delivered. Spot, add 5c.

VANADIUM ALLOYS

Ferrovanadium: Open hearth grade (V 50-55%, Si 8% max, C 3% max). Contract, any quantity, $3.20 per lb of contained V. Delivered. Spot, add 10c. **Special Grade:** (V 50-55% or 70-75%, Si 2% max, C 0.5% max) $3.30. **High Speed Grade:** (V 50-55% or 70-75%, Si 1.50% max, C 0.20% max) $3.40.

Grainal: Vanadium Grainal No. 1 $1.05 per lb; No. 79, 50c, freight allowed.

Vanadium Oxide: Contract, less carload lot, packed, $1.38 per lb contained V_2O_5, freight allowed. Spot, add 5c.

SILICON ALLOYS

50% Ferrosilicon: Carload, lump, bulk, 14.6c per lb contained Si. Packed, c.l. 17.1c, ton lot 18.55c, less ton 20.20c, f.o.b. Alloy, W. Va.; Ashtabula, Marietta, O.; Sheffield, Ala.; Keokuk, Iowa; Portland, Oreg. Spot, add 0.45c.

Low-Aluminum 50% Ferrosilicon: (Al 0.40% max). Add 1.45c to 50% ferrosilicon prices.

65% Ferrosilicon: Carload, lump, bulk, 15.75c per lb contained silicon. Packed, c.l. 17.75c, ton lot 19.55c, less ton 20.9c. Delivered. Spot, add 0.35c.

75% Ferrosilicon: Carload, lump, bulk, 16.9c per lb of contained Si. Packed, c.l. 18.8c, ton lot 20.45c, less ton 21.7c. Delivered. Spot add 0.3c.

90% Ferrosilicon: Carload, lump, bulk, 20c per lb of contained Si. Packed, c.l. 21.65c, ton lot 23.05c, less ton 24.1c. Delivered. Spot, add 0.25c.

Silicon Metal: (98% min Si, 1.00% max Fe, 0.07% max Ca). C.l. lump, bulk, 21.5c per lb of Si. Packed, c.l. 23.15c, ton lot 24.45c, less ton 25.45c. Add 0.5c for max 0.03% Ca grade. Add 0.5c for 0.50% Fe grade analyzing 98.25% min Si.

Alsifer: (Approx 20% Al, 40% Si, 40% Fe). Contract, basis f.o.b. Niagara Falls, N. Y., lump, carload, bulk, 9.85c per lb of alloy; ton lot, packed, 10.85c.

ZIRCONIUM ALLOYS

12-15% Zirconium Alloy: (Zr 12-15%, Si 39-43%, C 0.20% max). Contract, c.l., lump, bulk, 9.25c per lb of alloy. Packed, c.l. 10.45c, ton lot 11.6c, less ton 12.45c. Delivered. Spot, add 0.25c.

35-40% Zirconium Alloy: (Zr 35-40%, Si 47-52%, Fe 8-12%, C 0.50% max). Carload, bulk 26.25c per lb of alloy, carload, lump, packed 27.25c, ton lot 28.4c, less ton 29.65c. Freight allowed. Spot, add 0.25c.

BORON ALLOYS

Ferroboron: 100 lb or more packed (B 17.50% min, Si 1.50% max, Al 0.50% max, C 0.50% max). Contract, 100 lb or more 1" x D, $1.20 per lb of alloy; less than 100 lb $1.30. Delivered. Spot, add 5c. F.o.b. Washington, Pa., prices, 100 lb and over are as follows: Grade A (10-14% B) 85c per lb; Grade B (14-18% B) $1.20; Grade C (19% min B) $1.50.

Boresil: (3 to 4% B, 40 to 45% Si). Carload, bulk, lump, or 3" x D, $5.25 per lb of contained B. Packed, carload $5.40, ton to c.l. $5.50, less ton $5.60. Delivered.

Carbortam: (B 1 to 2%). Lump, carload $320 per ton, f.o.b. Suspension Bridge, N. Y., freight allowed same as high-carbon ferrotitanium.

CALCIUM ALLOYS

Calcium-Manganese-Silicon: (Ca 16-20%, Mn 14-18% and Si 53-59%). Carload, lump, bulk 23c per lb of alloy, carload packed 24.25c, ton lot 26.15c, less ton 27.15c. Delivered. Spot, add 0.25c.

Calcium-Silicon: (Ca 30-33%, Si 60-65%, Fe 1.5-3%). Carload, lump, bulk 24c per lb of alloy, carload packed 25.65c, ton lot 27.95c, less ton 29.45c. Delivered. Spot, add 0.25c.

BRIQUETTED ALLOYS

Chromium Briquets: (Weighing approx 3¾ lb each and containing 2 lb of Cr). Carload, bulk 19.60c per lb of briquet, in bags 20.70c; 3000 lb to c.l. pallets 20.80c; 2000 lb to c.l. in bags 21.90c; less than 2000 lb in bags 22.80c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Ferromanganese Briquets: (Weighing approx 3 lb and containing 2 lb of Mn). Carload, bulk 14.8c per lb of briquet; c.l., packed ,bags 16c; 3000 lb to c.l., pallets 16c; 2000 lb to c.l., bags 17.2c; less ton 18.1c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Silicomanganese Briquets: (Weighing approx 3½ lb and containing 2 lb of Mn and approx ½ lb of Si). C.l. bulk 15.1c per lb of briquet; c.l. packed, bags 16.3c, 3000 lb to c.l., pallets 16.3c; 2000 lb to c.l., bags 17.5c; less ton 18.4c. Delivered. Add 0.25c for notching. Spot. add 0.25c.

Silicon Briquets: (Large size—weighing approx 5 lb and containing 2 lb of Si and small sizes, weighing approx 2½ lb and containing 1 lb of Si). Carload, bulk 8c per lb or briquet; packed, bags 9.2c; 3000 lb to c.l., pallets 9.6c; 2000 lb to c.l.; bags 10.8c; less ton 11.7c. Delivered. Spot, add 0.25c.

Molybdic-Oxide Briquets: (Containing 2½ lb of Mo each). $1.49 per lb of Mo contained, f.o.b. Langeloth, Pa.

Titanium Briquets: Ti 98.27%, $1 per lb f.o.b. Niagara Falls, N. Y.

TUNGSTEN ALLOYS

Ferrotungsten: (70-80%). 5000 lb W or more $2.15 per lb (nominal) of contained W. Delivered.

OTHER FERROALLOYS

Ferrocolumbium: (Cb 50-60%, Si 8% max, C 0.1% max). Ton lots 2" x D, $3.45 per lb of contained Cb; less ton lots $3.50 (nominal). Delivered.

Ferrotantalum Columbium: (Cb 40% approx, Ta 20% approx, and Cb plus Ta 60% min, C 0.30% max). Ton lots 2" x D, $3.05 per lb of contained Cb plus Ta, delivered; less ton lots $3.10.

SMZ Alloy: (Si 60-65%, Mn 5-7%, Zr 5-7%, Fe 20% approx). Carlot bulk 19.25c per lb of alloy, c.l. packed ½ in. x 12 M 20.00c, ton lot 21.15c, less ton 22.40c. Delivered. Spot, add 0.25c.

Graphidox No. 4: (Si 48-52%, Ca 5-7%, Ti 9-11%). C.l. packed, 20c per lb of alloy, ton lot 21.15c; less ton lot 22.4c, f.o.b. Niagara Falls, N. Y., freight allowed to St. Louis.

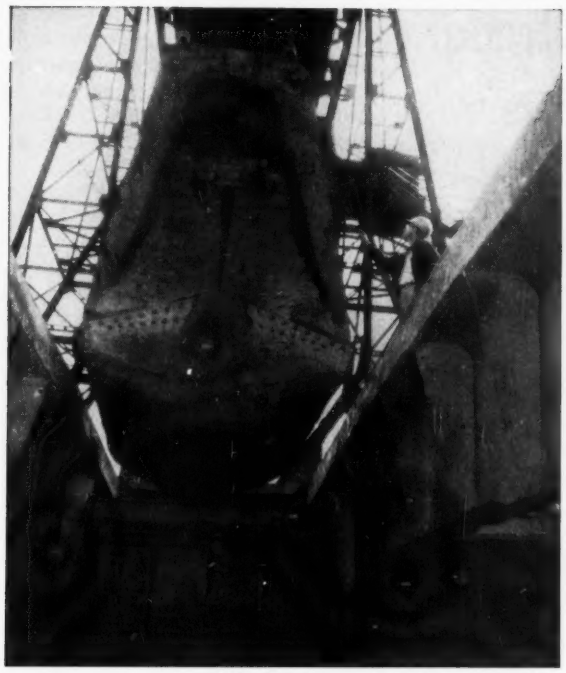
V-S Foundry Alloy: (Cr 38-42%, Si 17-19%, Mn 8-11%). C.l. packed 18.45c per lb of alloy; ton lot 19.95c; less ton lot 21.20c, f.o.b. Niagara Falls, N. Y., freight allowed to St. Louis.

Simanal: (Approx 20% each Si, Mn, Al; bal Fe). Lump, carload, bulk 19.25c. Packed c.l. 20.25c, 2000 lb to c.l. 21.25c; less than 2000 lb 21.75c per lb of alloy. Delivered.

Ferrophosphorus: (23-25% based on 24% P content with unitage of $5 for each 1% of P above or below the base). Carload, bulk, f.o.b. sellers' works, Mt. Pleasant, Siglo, Tenn., $120 per gross ton.

Ferromolybdenum: (55-75%). Per lb of contained Mo in 200-lb container, f.o.b. Langeloth and Washington, Pa., $1.76 in all sizes except powdered which is $1.82.

Technical Molybdic-Oxide: Per lb of contained Mo, in cans, $1.47; in bags, $1.46, f.o.b. Langeloth and Washington, Pa.



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Scrap Continues to Gather Strength

STEEL's index on No. 1 heavy melting advances another $1 (to $41) as trade sentiment improves. Active poststrike demand expected. Exports provide substantial support

Scrap Prices, Page 146

• **Chicago**—Although the end of the steel strike appears no nearer than it was a week ago, scrap market bullishness persists. Upward price revisions are fewer, but the stronger tone is evident. Consumer purchases are few, but broker and dealer activity pretty well reflects what is ahead when steelmaking furnaces resume production.

Scrap is plentiful, but each week the strike continues reduces the amount of iron ore that lake boats can bring down from the Lake Superior docks before cold weather closes navigation. Ore stocks will sustain blast furnaces for several months, but before spring, heavier use of scrap will be a necessity to offset dwindling ore inventories.

• **Philadelphia**—Prices are strong. They are unchanged on the major open hearth grades but have advanced on several other grades.

Continued heavy exports and the possibility of a sharp increase in demand when the strike is over point to higher prices on most grades in the near future. One trader estimates that district domestic mills may have to pay $4 or more a ton higher to compete with export buying on some major open hearth items.

Japan has contracted for 81 cargoes for October-December shipment. It's estimated that about 750,000 tons are involved. European consumers are also reported showing more interest in their needs. August shipments from this port alone totaled over 64,000 tons. All the tonnage was for Japan.

Prices advanced to $24-$25, delivered, on short shoveling turnings; to $20-$21 on machine shop turnings; to $45-$46 on structurals; to $47 on couplers, springs, and wheels; and to $60-$62 on rail crops. Drop broken machinery cast has been advanced to $52-$53, delivered.

• **New York** — Brokers' buying prices are unchanged, but the market undertone is strong due to continued good export demand and the possibility of substantial increases in domestic requirements as soon as the steel strike is ended.

• **Pittsburgh**—The market is tightening as dealers foresee settlement of the strike and higher prices within a few weeks. Low phos material is in short supply. No. 1 cupola cast remains strong. Short shovel turnings, currently quoted at $25, may jump to $30 or $32 when blast furnaces are relighted. Pennsylvania Railroad sold its scrap at prices averaging $1 a ton above last month's figures.

• **Cleveland**—Despite the absence of substantial mill buying, the market undertone continues strong.

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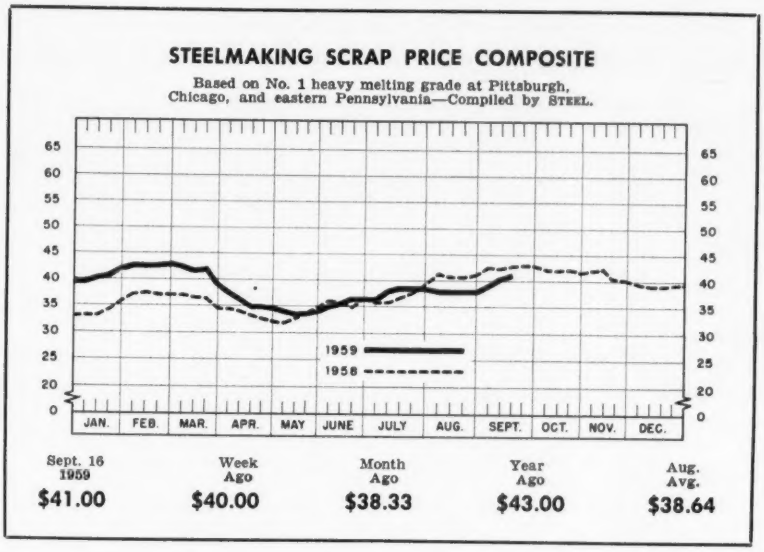


Brokers and dealers anticipate steady demand after the steel strike is settled. The foundry grades are fairly active with prices strong. Two recent railroad offerings (New York Central and Pennsylvania) resulted in advances of $1 to $3 on some railroad items. One car lot of No. 1 railroad cast went at $56.50. Large quantities of No. 2 steel are reported piled in the Valley.

• **Detroit**—The market is quiet. The only action reported is on Canadian orders which are going at $40 on track for bundles. Dealers are uncertain about action on the auto lists which close next week. Their concern stems from the fact that Detroit prices now equal those at Cleveland and Chicago. The feeling is that local prices may drop several dollars.

• **Cincinnati**—The market is strong despite the absence of substantial orders. Foundry business is picking up. The improvement is being reflected in demand for foundry grades of scrap. Several foundry items are quoted $1 a ton higher in brokers' lists.

• **Buffalo**—Dealers are optimistic, expecting good scrap business as soon as the steel strike is settled. They think the mills will want a steady flow of scrap to feed directly into the furnaces from cars, so that peak production can be achieved rapidly. Also, the need to conserve iron ore will increase blast furnace and steelworks use of scrap in the months ahead. Prices are firm.

• **St. Louis**—The market continues strong despite the absence of active mill demand. Consumers low on inventories are buying a little outside the immediate district. Local dealers are not inclined to sell much tonnage, anticipating better prices when the steel strike is settled. Currently, prices are unchanged.

• **Houston**—Prices are firm on mill and export demand. Lone Star Steel Co. raised its buying prices $2 a ton on a purchase calling for shipments through Oct. 24. The Lone Star mill returned to the market when union employees agreed to continue at work pending agreement on a new contract. Their old contract expired.

Broker prices based on the Lone Star order are pegged at $41 for No. 1 heavy melting on a remote basis ($4.11 freight and over). No. 2 heavy melting is quoted at $39, and No. 2 bundles at $28.

Supply of No. 1 heavy melting is short in Texas and Louisiana ports, and exporters are scrambling to fill cargoes. The premium grade hit a peak of $41.50 f.a.s. in Baton Rouge. Japanese mills have purchased 77 cargoes in the U. S. for shipment during the October-December period, and a Japanese metal bulletin stated January-March purchases in this country would total 580,000 tons.

• **Birmingham** — Despite limited buying in this district, prices advanced last week on a number of items. Two electric furnaces boosted their offers $2 a ton, and quickly filled their requirements. They'll be out of the market until next month. Prices on some foundry and railroad items advanced. The cast market is steady.

• **San Francisco**—The local market is alive with reports that Japanese orders are in the offing. Meanwhile, some buying by strike-bound mills is noted, assuring adequate supplies when steelmaking operations resume. The price structure is firm.

Associated Metals Co. of California, Oakland, Calif., has opened a branch scrapyard in San Francisco at 1150 25th St. It was formerly operated by Salco Iron & Metal Co.

• **Seattle**—Lack of storage space presents an increasingly series problem for dealers. Yards are well stocked, leaving little room for additional tonnage. One large firm reportedly bought 50,000 tons, then withdrew from the market because all of its space was filled.

Little material is moving, the industry awaiting resumption of steel mill operations, following which activity is expected to be brisk. Not much machine shop scrap is being handled because of the machinists' strike. Desirable tonnages of scrap are being sold periodically by the Puget Sound Navy Yard. Prices are nominal.

• **Los Angeles**—The market continues quiet and prices are unchanged. Little activity is anticipated until the steel strike is ended.

Ferroalloys . . .

Ferroalloy Prices, Page 142

Production of silicon alloys and metal in the second quarter this year totaled 207,621 net tons, up 8 per cent from the 192,255 tons produced in the first three months of the year, reports the U. S. Bureau of Mines. Shipments in the period were 219,895 tons, up 14 per cent compared with the 192,182 tons moved in the first quarter.

Apparent consumption (shipments, plus imports, minus exports) gained 14 per cent to 222,006 net

(*Please turn to Page* 151)

Iron and Steel Scrap

Consumer prices per gross ton, except as otherwise noted, including broker's commission, as reported to STEEL, Sept. 16, 1959. *Changes shown in italics.*

STEELMAKING SCRAP COMPOSITE

Sept. 16	$41.00
Sept. 9	40.00
Aug. Avg.	38.64
Sept. 1958	42.87
Sept. 1954	29.94

Based on No. 1 heavy melting grade at Pittsburgh, Chicago, and eastern Pennsylvania.

PITTSBURGH

No. 1 heavy melting	*41.00-42.00*
No. 2 heavy melting	33.00-34.00
No. 1 dealer bundles	*44.00-45.00*
No. 2 bundles	29.00-30.00
No. 1 busheling	41.00-42.00
No. 1 factory bundles	47.00-48.00
Machine shop turnings	*21.00-22.00*
Mixed borings, turnings	*21.00-22.00*
Short shovel turnings	24.00-25.00
Cast iron borings	*24.00-25.00*
Cut structurals:	
2 ft and under	48.00-49.00
3 ft and under	47.00-48.00
Heavy turnings	34.00-35.00
Punchings & plate scrap	49.00-50.00
Electric furnace bundles	47.00-48.00

Cast Iron Grades

No. 1 cupola	47.00-48.00
Stove plate	45.00-46.00
Unstripped motor blocks	33.00-34.00
Clean auto cast	46.00-47.00
Drop broken machinery	52.00-53.00

Railroad Scrap

No. 1 R.R. heavy melt.	*46.00-47.00*
Rails, 2 ft and under	*60.00-61.00*
Rails, 18 in. and under	*61.00-62.00*
Random rails	*56.00-57.00*
Angles, splice bars	*55.00-56.00*
Railroad specialties	*55.00-56.00*
Rails, rerolling	*64.00-65.00*

Stainless Steel Scrap

18-8 bundles & solids	230.00-235.00
18-8 turnings	115.00-120.00
430 bundles & solids	125.00-130.00
430 turnings	55.00-65.00

CHICAGO

No. 1 hvy melt., indus.	41.00-42.00
No. 1 hvy melt., dealer	39.00-40.00
No. 2 hvy melting	36.00-37.00
No. 1 factory bundles	44.00-45.00
No. 1 dealer bundles	40.00-41.00
No. 2 bundles	26.00-27.00
No. 1 busheling, indus.	41.00-42.00
No. 1 busheling, dealer	39.00-40.00
Machine shop turnings	19.00-20.00
Mixed borings, turnings	21.00-22.00
Short shovel turnings	21.00-22.00
Cast iron borings	21.00-22.00
Cut structurals, 3 ft	50.00-51.00
Punchings & plate scrap	*51.00-52.00*

Cast Iron Grades

No. 1 cupola	55.00-56.00
Stove plate	51.00-52.00
Unstripped motor blocks	46.00-47.00
Clean auto cast	61.00-62.00
Drop broken machinery	61.00-62.00

Railroad Scrap

No. 1 R.R. heavy melt.	44.00-45.00
R.R. malleable	62.00-63.00
Rails, 2 ft and under	*60.00-61.00*
Rails, 18 in. and under	*61.00-62.00*
Angles, splice bars	*55.00-56.00*
Axles	58.00-59.00
Rails, rerolling	62.00-63.00

Stainless Steel Scrap

18-8 bundles & solids	210.00-215.00
18-8 turnings	110.00-115.00
430 bundles & solids	115.00-120.00
430 turnings	55.00-60.00

YOUNGSTOWN

No. 1 heavy melting	41.00-42.00
No. 2 heavy melting	27.00-28.00
No. 1 busheling	44.00-45.00
No. 1 bundles	44.00-45.00
No. 2 bundles	25.00-26.00
Machine shop turnings	17.00-18.00
Short shovel turnings	22.00-23.00
Cast iron borings	22.00-23.00
Low phos.	45.00-46.00
Electric furnace bundles	45.00-46.00

Railroad Scrap

No. 1 R.R. heavy melt.	43.00-44.00

CLEVELAND

No. 1 heavy melting	38.00-39.00
No. 2 heavy melting	27.00-28.00
No. 1 factory bundles	44.00-45.00
No. 1 bundles	40.00-41.00
No. 2 bundles	25.00-26.00
No. 1 busheling	40.00-41.00
Machine shop turnings	14.00-15.00
Short shovel turnings	20.00-21.00
Mixed borings, turnings	20.00-21.00
Cast iron borings	20.00-21.00
Cut foundry steel	40.00-41.00
Cut structurals, plates 2 ft and under	47.00-48.00
Low phos. punchings & plate	41.00-42.00
Alloy free, short shovel turnings	22.00-23.00
Electric furnace bundles	41.00-42.00

Cast Iron Grades

No. 1 cupola	47.00-48.00
Charging box cast	38.00-39.00
Heavy breakable cast	38.00-39.00
Stove plate	44.00-45.00
Unstripped motor blocks	36.00-37.00
Brake shoes	36.00-37.00
Clean auto cast	52.00-53.00
Burnt cast	37.00-38.00
Drop broken machinery	52.00-53.00

Railroad Scrap

R.R. malleable	65.00-66.00
Rails, 2 ft and under	*58.00-59.00*
Rails, 18 in. and under	*59.00-60.00*
Rails, random lengths	52.00-53.00
Cast steel	46.00-47.00
No. 1 railroad cast	*55.50-56.50*
Railroad specialties	*51.00-52.00*
Angles, splice bars	*53.00-54.00*
Rails, rerolling	*61.00-62.00*

Stainless Steel
(Brokers' buying prices; f.o.b. shipping point)

18-8 bundles, solids	215.00-220.00
18-8 turnings	110.00-115.00
430 clips, bundles, solids	125.00-130.00
430 turnings	45.00-55.00

ST. LOUIS

(Brokers' buying prices)

No. 1 heavy melting	33.00
No. 2 heavy melting	31.00
No. 1 bundles	39.00
No. 2 bundles	23.00
No. 1 busheling	37.00
Machine shop turnings	*15.50*
Short shovel turnings	*17.50*

Cast Iron Grades

No. 1 cupola	54.00
Charging box cast	45.00
Heavy breakable cast	44.00
Unstripped motor blocks	44.00
Clean auto cast	56.00
Stove plate	45.00

Railroad Scrap

No. 1 R.R. heavy melt.	42.00
Rails, 18 in. and under	51.50
Rails, random lengths	45.00
Rails, rerolling	59.00
Angles, splice bars	48.00

BIRMINGHAM

No. 1 heavy melting	35.00-36.00
No. 2 heavy melting	*29.00-30.00*
No. 1 bundles	38.00-39.00
No. 2 bundles	*24.00-25.00*
No. 1 busheling	*40.00-41.00*
Cast iron borings	14.00-15.00
Machine shop turnings	24.00-25.00
Short shovel turnings	27.00-28.00
Bar crops and plates	*45.00-46.00*
Structurals & plates	*44.00-45.00*
Electric furnace bundles	*40.00-41.00*
Electric furnace:	
3 ft and under	*38.00-39.00*
2 ft and under	*39.00-40.00*

Cast Iron Grades

No. 1 cupola	54.00-55.00
Stove plate	54.00-55.00
Charging box cast	29.00-30.00
Unstripped motor blocks	*42.00-43.00*
No. 1 wheels	43.00-44.00

Railroad Scrap

No. 1 R.R. heavy melt.	*39.00-40.00*
Rails, 18 in. and under	52.00-53.00
Rails, rerolling	*59.00-60.00*
Rails, random lengths	46.00-47.00
Angles, splice bars	44.00-45.00

PHILADELPHIA

No. 1 heavy melting	41.00
No. 2 heavy melting	36.00
No. 1 bundles	42.00
No. 2 bundles	27.00-28.00
No. 1 busheling	42.00
Electric furnace bundles	43.00
Mixed borings, turnings	20.00†
Short shovel turnings	*24.00-25.00*
Machine shop turnings	*20.00-21.00*
Heavy turnings	34.00
Structurals & plate	*45.00-46.00*
Couplers, springs, wheels	*47.00*
Rail crops, 2 ft & under	*60.00-62.00*

Cast Iron Grades

No. 1 cupola	41.00-42.00
Heavy breakable cast	45.00
Drop broken machinery	*52.00-53.00*
Malleable	67.00-68.00

NEW YORK

(Brokers' buying prices)

No. 1 heavy melting	31.00-32.00
No. 2 heavy melting	28.00-29.00
No. 1 bundles	30.00-31.00
No. 2 bundles	20.00-21.00
Machine shop turnings	9.00-10.00†
Mixed borings, turnings	12.00-13.00†
Short shovel turnings	13.00-14.00†
Low phos. structurals & plates	36.00-37.00

Cast Iron Grades

No. 1 cupola	36.00-37.00
Unstripped motor blocks	25.00-26.00
Heavy breakable	34.00-35.00

Stainless Steel

18-8 sheets, clips, solids	195.00-200.00
18-8 borings, turnings	85.00-90.00
410 sheets, clips, solids	55.00-60.00
430 sheets, clips, solids	85.00-90.00

BUFFALO

No. 1 heavy melting	33.00-34.00
No. 2 heavy melting	28.00-29.00
No. 1 bundles	33.00-34.00
No. 2 bundles	23.00-24.00
No. 1 busheling	33.00-34.00
Short shovel turnings	21.00-22.00
Machine shop turnings	17.00-18.00
Cast iron borings	19.00-20.00
Low phos structurals and plate, 2 ft and under	43.00-44.00

Cast Iron Grades
(F.o.b. shipping point)

No. 1 cupola	46.00-47.00
No. 1 machinery	50.00-51.00

Railroad Scrap

Rails, random lengths	45.00-46.00
Rails, 3 ft and under	51.00-52.00
Railroad specialties	43.00-44.00

CINCINNATI

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	35.50-36.50
No. 2 heavy melting	30.50-31.50
No. 1 bundles	35.50-36.50
No. 2 bundles	25.00-26.00
No. 1 busheling	35.50-36.50
Machine shop turnings	17.00-18.00
Mixed borings, turnings	17.00-18.00
Short shovel turnings	19.00-20.00
Cast iron borings	18.00-19.00
Low phos., 18 in.	*47.00-48.00*

Cast Iron Grades

No. 1 cupola	47.00-48.00
Heavy breakable cast	43.00-44.00
Charging box cast	43.00-44.00
Drop broken machinery	*57.00-58.00*

Railroad Scrap

No. 1 R.R. heavy melt.	41.00-42.00
Rails, 18 in. and under	*57.00-58.00*
Rails, random lengths	*49.00-50.00*

HOUSTON

(Exporters' buying prices; f.a.s.)

No. 1 heavy melting	33.00-39.00
No. 2 heavy melting	35.00-36.00
No. 2 bundles	25.00-26.00

(Brokers' buying prices; f.o.b. cars)

No. 1 heavy melting	34.00†
No. 2 heavy melting	31.00†
No. 1 bundles	34.00
No. 2 bundles	20.00†
Machine shop turnings	17.00
Short shovel turnings	20.00
Low phos, plates & structurals	45.50-46.50

Cast Iron Grades

No. 1 cupola	47.00-48.00
Heavy breakable	33.00
Foundry malleable	43.00-44.00
Unstripped motor blocks	38.50-39.50

Railroad Scrap

No. 1 R.R. heavy melt.	34.00

BOSTON

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	31.00-32.00
No. 2 heavy melting	25.00-25.50
No. 1 bundles	30.00-31.00
No. 1 busheling	30.00-31.00
Machine shop turnings	*10.00-11.00*
Short shovel turnings	*12.00-13.00*
No. 1 cast	37.00-38.00
Mixed cupola cast	36.00-37.00
No. 1 machinery cast	38.00-38.50

DETROIT

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	*35.00-36.00*
No. 2 heavy melting	23.00-24.00
No. 1 bundles	*38.00-39.00*
No. 2 bundles	22.00-23.00
No. 1 busheling	34.00-35.00
Machine shop turnings	*13.00-14.00*
Mixed borings, turnings	*14.00-15.00*
Short shovel turnings	15.00-16.00

Cast Iron Grades

No. 1 cupola	*47.00-48.00*
Stove plate	*40.00-41.00*
Heavy breakable	39.00-40.00
Unstripped motor blocks	*30.00-31.00*
Charging box cast	39.00-40.00
Clean auto cast	*50.00-51.00*

SEATTLE

No. 1 heavy melting	35.00†
No. 2 heavy melting	33.00†
No. 1 bundles	27.00†
No. 2 bundles	22.00†
Machine shop turnings	17.00†
Mixed borings, turnings	17.00†
Electric furnace No. 1.	38.00†

Cast Iron Grades

No. 1 cupola	34.00†
Heavy breakable cast	28.00†
Unstripped motor blocks	26.00†
Stove plate (f.o.b. plant)	21.00†

LOS ANGELES

No. 1 heavy melting	38.00-39.00*
No. 2 heavy melting	36.00*
No. 1 bundles	33.00
No. 2 bundles	20.00
Machine shop turnings	16.00
Shovel turnings	18.00
Cast iron borings	18.00
Cut structurals and plate 1 ft and under	48.00

Cast Iron Grades
(F.o.b. shipping point)

No. 1 cupola	47.00

Railroad Scrap

No. 1 R.R. heavy melt.	39.00

SAN FRANCISCO

No. 1 heavy melting	36.00
No. 2 heavy melting	33.00
No. 1 bundles	33.00
No. 2 bundles	22.00
Machine shop turnings	16.00
Mixed borings, turnings	16.00
Cast iron borings	16.00
Heavy turnings	16.00
Short shovel turnings	16.00
Cut structurals, 3 ft	42.00

Cast Iron Grades

No. 1 cupola	47.00
Charging box cast	34.00
Stove plate	34.00
Heavy breakable cast	28.00
Unstripped motor blocks	31.00
Clean auto cast	40.00
Drop broken machinery	40.00
No. 1 wheels	34.00

HAMILTON, ONT.

(Brokers' buying prices)

No. 1 heavy melting	32.25
No. 2 heavy melting	28.25
No. 1 bundles	32.25
No. 2 bundles	22.75
Mixed steel scrap	24.25
Mixed borings, turnings	13.00
Busheling, new factory: Prepared	32.25
Unprepared	26.25
Short steel turnings	17.00

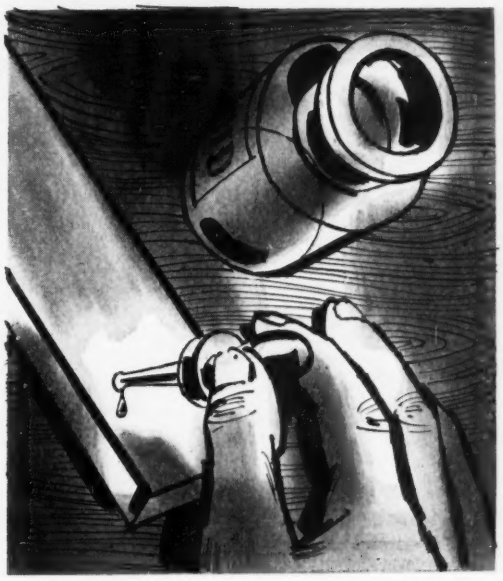
Cast Iron Grades‡

No. 1 machinery cast	46.50-48.00

•Delivered to docks.
†Nominal.
‡F.o.b. Hamilton, Ont.

S-E-G-R-E-G-A-T-E-D SCRAP IS WORTH MORE

Rub specimen with emery paper to obtain clean surface. Add 1 drop of 10 percent hydrochloric acid; allow 1 minute reaction time. Add 1 drop of 10 percent potassium ferricyanide; after 30 seconds, if red, green or yellow-brown color appears — or no color — sample belongs to nickel alloy group. Add 1 drop of concentrated nitric acid and wait 1 minute. If there is a black precipitate, the sample is probably "S" MONEL.



Here is how to test for "S" MONEL!

This nickel-copper alloy containing approximately four percent silicon is an age-hardenable cast material. Because of its high strength, hardness and unusual resistance to destructive chemical action, it has many industrial applications.

One of "S" Monel's most valued qualities is its ability to resist galling or seizing when it is in rubbing contact with other metals where little or no lubrication is possible. This anti-galling quality is additionally useful if a corrosive condition also exists.

Because of its unusual composition, it is important that it be separated from other scrap. Our personnel, equipment and strategically located facilities, are specifically geared to supply you with dependable segregated alloy metals in any required amount. We welcome your inquiry.

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Copper Union Getting Shaky

That's what it looks like as Montana local makes a move to break the deadlock with Anaconda. But many in the industry believe a general settlement is still far off

Nonferrous Metal Prices, Pages 150 & 151

THE COPPER UNION's position doesn't appear to be as firm as its tough talk of a few weeks ago might have led you to believe. In fact, it may be downright shaky.

The first chink in the armor of union solidarity came last week when a maverick Montana local (117) of the International Union of Mine, Mill & Smelter Workers petitioned Anaconda Co. for a resumption of the negotiations which broke off in August. Union officials hinted they might be willing to return to work under terms of the old contract while negotiations are underway. But the initial Anaconda reaction was "no contract, no work."

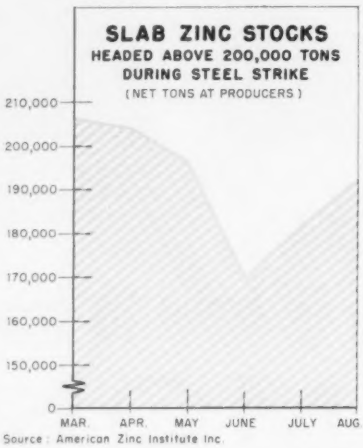
"The local's attitude becomes especially significant," says one observer, "when you realize that once the men return to work, it's awfully hard to get them out again."

• **Demands Unclear**—As talks got underway at Butte last week, the union still hadn't spelled out specific demands. It's felt they're shooting for a package similar to the two already signed: American Metal Climax recently granted a two year contract with a package increase of 21.6 cents an hour. American Brass Co. (an Anaconda subsidiary) also recently signed a two year pact calling for gains of 7 cents an hour in wages and 6.5 cents in fringe benefits, with a wage reopener effective July 1, 1960.

Anaconda officials make no secret that they consider the settlements excessive. The company's Montana properties are probably the most expensive to mine in the nation, and any contract will have to reflect this condition, management asserts.

• **Quiet Elsewhere** — Other struck copper producers say they haven't been approached with a similar proposal by the union. If any negotiations are underway other than at Butte, they're a well kept secret.

One company's labor relations chief says he is still anticipating a long strike, at least at his firm's operations. But he believes the Anaconda talks may provide "some semblance of an atmosphere for an industry-wide settlement."



Source: American Zinc Institute Inc.

• **Not Hurting Yet**—Neither producers nor consumers have been badly inconvenienced by the strike as yet. In fact, the union did what the producers were unable to do for themselves—strengthen the copper market. Here's why: Even though business in the first eight months of 1959 ran over 40 per cent better than it did in the same period last year, heavy world-wide overproduction was creating a metal surplus and weakening the price structure. Also, a big block of buying was for inventory. If a strike hadn't been called, business would have been pretty lean in the fall.

Buyers aren't panicky, but there is enough demand to quickly grab off the available copper. It looks like we may soon have a squeeze in supply and possibly a tight situation through the remainder of the year. Overseas suppliers have available copper they will continue to ship into the U. S., easing the situation if shipments aren't tied up by a dock strike on Oct. 1.

• **Prices Everywhere**—Copper prices continue to run across the map. Most primary companies with metal to sell are quoting 31.5 cents a pound, but the nation's largest producer, Kennecott Copper Corp., is holding at 30 cents. Custom smelted copper is at 33 cents; dealer prices vary from day to day. Chances are there won't be too much of an upward price spiral if the copper strike ends within the next four weeks. If it continues longer, look for higher prices but no runaway.

• **First Effects** — August statistics just released by the Copper Institute give the first glimpse of the strike's effects. Some highlights: U. S. refined production down 54,000 tons to 79,860 tons; deliveries to fabricators off 19,000 tons to 89,123 tons; refined stocks down over 11,000 tons to 92,175 tons.

NONFERROUS PRICE RECORD

	Sept. 16 Price	Last Change	Previous Price	Aug. Avg	July Avg	Sept., 1958 Avg
Aluminum	24.70	Aug. 1, 1958	24.00	24.700	24.700	24.700
Copper	30.00–33.00	Aug. 31, 1959	30.00	30.010	30.048	26.428
Lead	12.80	Aug. 24, 1959	11.80	12.069	11.800	10.730
Magnesium	35.25	Aug. 13, 1956	33.75	35.250	35.250	35.250
Nickel	74.00	Dec. 6, 1956	64 50	74.000	74.000	74 000
Tin	102.625	Sept. 16, 1959	102.50	102.333	102.298	94.120
Zinc	11.00	Feb. 25, 1959	11.50	11.000	11.000	10.000

Quotations in cents per pound based on: COPPER, mean of primary and secondary, deld. Conn. Valley; LEAD, common grade, deld. St. Louis; ZINC, prime western, E. St Louis; TIN, Straits, deld. New York; NICKEL, electrolytic cathodes, 99.9%, base size at refinery, unpacked; ALUMINUM, primary pig, 99.5+%, f.o.b. customer custody; MAGNESIUM, pig 99.8%, Velasco, Tex.

DoALL Sawing Specialists, Les Borgeson (left) and Manley Hanson (right), president of the DoALL Cleveland Company, and Dean Rapprich (center), powder metallurgy superintendent of Brush Beryllium Company, examine the fine finish and accuracy of cut made by the DoALL Band Mill in cutting the world's largest beryllium billet.

LARGEST POWDER-METALLURGY BILLET SLICED BY BRUSH BERYLLIUM; COSTS SLASHED BY DoALL BAND MACHINING

Here's another example of the way modern band machining can change production methods and save money—$51,000 in this case.

Brush Beryllium Company, Cleveland, Ohio, formerly pressed hexagonal 30″ x 30″ nuclear reactor plates of high-purity beryllium on a one-at-a-time basis. This process required an extra thickness allowance and additional machining to remove excess material.

Then engineers of Brush Beryllium Company realigned the entire project to take advantage of the speed and savings made possible by modern band machining methods.

Now gigantic 1¼-ton billets are pressed—the world's largest powdered metallurgic part—large enough to make 13 reactor plates. The DoALL Band Mill using a Demon* High-Speed Steel Blade slices the huge billet into 1″ and 2″ plates. Result: spectacular savings in production time and over $51,000 of material.

Here again DoALL Sawing Specialists were privileged to assist with their specialized machining knowledge and experience. More than 200 DoALL Sawing Specialists, located from coast to coast, are ready to help industry with its machining problems. Call your DoALL Specialist today. His expert help and the services of the DoALL Research Laboratory are free.

FREE! "Saw Blade Selector Chart" helps operators improve their sawing techniques . . . get this wall chart from your local DoALL store.

SB-78

THIS IS A TYPICAL DoALL STORE

The DoALL Company, Des Plaines, Illinois

Nonferrous Metals

Cents per pound, carlots except as otherwise noted.

PRIMARY METALS AND ALLOYS

Aluminum: 99.5%, pigs, 24.70; ingots, 26.80, 30,000 lb or more, f.o.b. customer custody.

Aluminum Alloy: No. 13, 28.60; No. 43, 28.40; No. 195, 29.40; No. 214, 30.20; No. 356, 28.60; 30 or 40 lb ingots.

Antimony: R.M.M. brand, 99.5%, 29.00; Lone Star brand, 29.50, f.o.b. Laredo, Tex., in bulk. Foreign brands, 99.5%, 24.50-25.00, New York, duty paid, 10,000 lb or more.

Beryllium: 97% lump or beads, $71.50 per lb, f.o.b. Cleveland or Reading, Pa.

Beryllium Aluminum: 5% Be, $74.75 per lb of contained Be, with balance as Al at market price, f.o.b. shipping point.

Beryllium Copper: 3.75-4.75% Be, $43 per lb of contained Be, with balance as Cu at market price on shipment date, f.o.b. shipping point.

Bismuth: $2.25 per lb, ton lots.

Cadmium: Sticks and bars, $1.30 per lb deld.

Cobalt: 97.99%, $1.75 per lb for 500-lb keg, $1.77 per lb for 100 lb case; $1.82 per lb under 100 lb.

Columbium: Powder, $55-85 per lb nom.

Copper: Electrolytic, 30.00-31.50 deld.; custom smelters, 33.00; lake, 30.00-31.50 deld.; fire refined, 29.75-31.25 deld.

Germanium: First reduction, less than 1 kg, 38.30 per gram; 1-10 kg, 33.30 per gram; 10 kg or more, 31.30 per gram; intrinsic grade, 33.30-35.30 per gram.

Gold: U. S. Treasury, $35 per oz.

Indium: 99.9%, $2.25 per troy oz.

Iridium: $75-80 per troy oz nom.

Lead: Common, 12.80; chemical, 12.90; corroding, 12.90, St. Louis. New York basis, add 0.20.

Lithium: 1 lb or 2 lb ingots, less than 50 lb, $11 per lb, f.o.b. Minneapolis; 50-99 lb, $10; 100-499 lb, $9.50; 500 lb or more, $9 per lb, delivered.

Magnesium: Pig, 35.25; ingot, 36.00 f.o.b. Velasco, Tex.; 12 in. sticks, 59.00 f.o.b. Madison, Ill.

Magnesium Alloys: AZ91A (diecasting), 40.75 deld.; AZ63A, AZ92A, AZ91C (sand casting), 40.75, f.o.b. Velasco, Tex.

Mercury: Open market, spot, New York, $223-225 per 75 lb flask.

Molybdenum: Unalloyed forging billets, 4.125-7.0 in. diam., 50-4999 lb, $8.15-11.50 per lb, depending on quantity; 5000 lb or more, $8 per lb, f.o.b. Coldwater, Mich.

Nickel: Electrolytic cathodes, sheets (4 x 4 in. and larger), unpacked, 74.00; 10-lb pigs, unpacked, 78.25; "XX" nickel shot, 79.50; "F" nickel shot for addition to cast iron, 74.50; "F" nickel, 5 lb ingots in kegs for addition to cast iron, 75.50. Prices f.o.b. Port Colborne, Ont., including import duty. New York basis, add 1.01. Nickel oxide sinter at Buffalo, New York, or other established U. S. ports of entry, contained nickel, 69.60.

Osmium: $70-100 per troy oz nom.

Palladium: $18-20 per troy oz.

Platinum: $77-80 per troy oz from refineries.

Radium: $16-21.50 per mg radium content, depending on quantity.

Rhodium: $122-125 per troy oz.

Ruthenium: $55-60 per troy oz.

Selenium: $7.00 per lb, commercial grade.

Silver: Open market, 91.375 per troy oz.

Sodium: Solid pack, c.l., 19.50; l.c.l., 20.00; brick, c.l., 21.00; l.c.l., 21.50; tank car, 17.00.

Tantalum: Melting stock, $35 per lb; rod, $60 per lb nom.; sheet, $55 per lb nom.

Tellurium: $2.50 per lb.

Thallium: $7.50 per lb.

Tin: Straits, N. Y., spot and prompt, 102.625.

Titanium: Sponge, 99.3 + % grade A-1, ductile (0.3% Fe max.), $1.60 per lb; grade A-2 (0.5% Fe max.), $1.50 per lb.

Tungsten: Powder, 98.8%, carbon reduced, 1000-lb lots, $2.75-2.90 per lb nom., f.o.b. shipping point; less than 1000 lb, add 15.00; 99 + % hydrogen reduced, $3.30-3.80.

Zinc: Prime western, 11.00; brass special, 11.25; intermediate, 11.50, East St. Louis, freight allowed over 0.50 per lb. New York basis, add 0.50. High grade, 12.25; special high grade, 12.50 deld. Diecasting alloy ingot No. 3, 14.25; No. 2, 14.75; No. 5, 14.50 deld.

Zirconium: Reactor grade sponge, 100 lb or less, $7 per lb; 100-500 lb, $6.50 per lb; over 500 lb, $6 per lb.
(Note: Chromium, manganese, and silicon metals are listed in ferroalloy section.)

SECONDARY METALS AND ALLOYS

Aluminum Ingot: Piston alloys, 26.00-27.75; No. 12 foundry alloy (No. 2 grade), 23.75-24.00; 5% silicon alloy, 0.60 Cu max., 25.00; 13 alloy, 0.60 Cu max., 25.00; 195 alloy, 26.75-27.00; 108 alloy, 24.25-24.50. Steel deoxidizing grades, notch bars, granulated or shot: Grade 1, 24.50; grade 2, 23.25; grade 3, 22.25; grade 4, 21.50.

Brass Ingot: Red brass, No. 115, 30.75; tin bronze, No. 225, 41.25; No. 245, 35.00; high-leaded tin bronze, No. 305, 35.00; No. 1 yellow, No. 405, 25.75; manganese bronze, No. 421, 28.75.

Magnesium Alloy Ingot: AZ63A, 37.50; AZ91B, 37.50; AZ91C, 41.25; AZ92A, 37.50.

NONFERROUS PRODUCTS

BERYLLIUM COPPER

(Base prices per lb, plus mill extras, 2000 to 5000 lb; nom. 1.9% Be alloy.) Strip, $1.91, f.o.b. Temple, Pa., or Reading, Pa.; rod, bar, wire, $1.89, f.o.b. Temple, Pa.

COPPER WIRE

Bars, soft, f.o.b. eastern mills, 20,000-lb lots, 36.85; l.c.l., 37.48. Weatherproof, 20,000-lb lots, 37.42; l.c.l., 38.17.

LEAD

(Prices to jobbers, f.o.b. Buffalo, Cleveland, Pittsburgh.) Sheets, full rolls, 140 sq ft or more, $18.50 per cwt; pipe, full coils, $18.50 per cwt; traps and bends, list prices plus 30%.

TITANIUM

(Prices per lb, 10,000 lb and over, f.o.b. mill.) Sheet and strip, $7.25-17.00; sheared mill plate, $5.25-10.00; wire, $5.75-10.00; forging billets, $3.55-5.75; hot-rolled and forged bars, $4.25-7.50.

ZINC

(Prices per lb, c.l., f.o.b. mill) Sheets, 26.00; ribbon zinc in coils, 21.50; plates, 20.00.

ZIRCONIUM

Plate, $12.50-19.20; H.R. strip, $12.50-22.90; C.R. strip, $15.90-31.25; forged or H.R. bars, $11.00-17.40.

NICKEL, MONEL, INCONEL

	"A" Nickel	Monel	Inconel
Sheets, C.R.	138	120	138
Strip, C.R.	124	108	138
Plate, H.R.	130	110	126
Rod, Shapes, H.R.	107	89	109
Seamless Tubes	157	129	200

ALUMINUM

Sheets: 1100, 3003 and 5005 mill finish (30,000 lb base; freight allowed).

Thickness Range Inches	Flat Sheet	Coiled Sheet
0.250-0.136	42.80-47.30	.....
0.136-0.096	43.20-48.30	.....
0.126-0.103	.....	39.20-39.80
0.096-0.077	43.80-50.00	39.30-40.00
0.077-0.068	44.30-52.20	.....
0.077-0.061	.....	39.50-40.70
0.068-0.061	44.30-52.20	.....
0.061-0.048	44.90-54.40	40.10-41.80
0.048-0.038	45.40-57.10	40.60-43.20
0.038-0.030	45.70-62.00	41.00-45.70
0.030-0.024	46.20-53.70	41.30-45.70
0.024-0.019	46.90-56.80	42.40-44.10
0.019-0.017	47.70-54.10	43.00-44.70
0.017-0.015	48.60-55.00	43.80-45.50
0.015-0.014	46.60	44.80-46.50
0.014-0.012	50.80	45.50
0.012-0.011	51.00	46.70
0.011-0.0095	53.50	48.10
0.0095-0.0085	54.60	49.60
0.0085-0.0075	56.20	50.80
0.0075-0.007	57.70	52.30
0.007-0.006	59.30	53.70

ALUMINUM (continued)

Plates and Circles: Thickness 0.250-3 in. 24-60 in. width or diam., 72-240 in. lengths.

Alloy	Plate Base	Circle Base
1100-F, 3003-F	42.40	47.20
5050-F	43.50	48.30
3004-F	44.50	50.20
5052-F	45.10	50.90
6061-T6	45.60	51.70
2024-T4	49.30	56.10
7075-T6*	57.60	64.70

*24-48 in. width or diam., 72-180 in. lengths.

Screw Machine Stock: 30,000 lb base.

Diam. (in.) or across flats*	Round 2011-T3	Round 2017-T4	Hexagonal 2011-T3	Hexagonal 2017-T4
0.125	76.90	73.90	....	....
0.250	62.00	60.20	69.10	76.60
0.375	61.20	60.00	73.50	68.50
0.500	61.20	60.00	73.50	68.50
0.625	61.20	60.00	69.80	64.20
0.750	59.70	58.40	63.60	60.40
0.875	59.70	58.40	63.60	60.40
1.000	59.70	58.40	63.60	60.40
1.125	57.30	56.10	61.50	58.30
1.250	57.30	56.10	61.50	58.30
1.500	57.30	56.10	61.50	58.30
1.500	57.30	56.10	61.50	58.30
1.625	55.00	53.60	....	56.20
1.750	55.00	53.60	60.30	56.20
1.875	55.00	53.60	....	56.20
2.000	55.00	53.60	60.30	56.20
2.125	53.50	52.10	....	....
2.250	53.50	52.10	....	56.20
2.375	53.50	52.10	....	....
2.500	53.50	52.10	....	56.20
2.625	....	50.40	....	....
2.750	51.90	50.40	....	56.20
2.875	....	50.40	....	....
3.000	51.90	50.40	....	56.20
3.125	....	50.40	....	....
3.250	....	50.40	....	....
3.375	....	50.40	....	....

*Selected sizes.

Forging Stock: Round, Class 1, random lengths, diam., 0.375-8 in., "F" temper; 2014, 42.20-55.00; 6061, 41.60-55.00; 7075, 61.60-75.00; 7070, 66.60-80.00.

Pipe: ASA schedule 40, alloy 6063-T6 standard length, plain ends, 90,000 lb base, dollars per 100 ft. Nominal pipe sizes: ¾ in., 18.85; 1 in., 29.75; 1¼ in., 40.30; 1½ in., 48.15; 2 in., 58.30; 4 in., 160.20; 6 in., 287.55; 8 in., 432.70.

Extruded Solid Shapes:

Factor	Alloy 6063-T5	Alloy 6062-T6
9-11	42.70-44.20	51.30-55.50
12-14	42.70-44.20	52.00-56.50
15-17	42.70-44.20	53.20-58.20
18-20	43.20-44.70	55.20-60.80

MAGNESIUM

Sheet and Plate: AZ31B standard grade, 0.32 in., 103.10; .081 in., 77.90; .125 in., 70.40; .188 in., 69.00; .250-2.0 in., 67.90. AZ31B spec. grades, .032 in., 171.30; .081 in., 108.80; .125 in., 98.10; .188 in., 95.70; .250-2.00 in., 93.30. Tread plate, 60-192 in. lengths, 24-72 in. widths; .125 in., 74.90; .188 in., 71.70-72.10; .25-.75 in., 70.60-71.60. Tooling plate, 0.25-3.0 in., 73.00.

Extruded Solid Shapes:

Factor	Com. Grade (AZ31C)	Spec. Grade (AZ31B)
9-11	65.30-67.60	84.60-87.40
12-14	65.30-67.60	85.70-88.00
24-26	66.10-75.30	90.60-91.30
36-38	66.10-75.30	104.20-105.30

NONFERROUS SCRAP

DEALERS' BUYING PRICES

Copper and Brass: No. 1 heavy copper and wire, 24.50-25.00; No. 2 heavy copper and wire, 23.00-23.50; light copper, 23.00-23.50; No. 1 composition red brass, 18.75-19.25; No. 1 com-

BRASS MILL PRICES

MILL PRODUCTS a

SCRAP ALLOWANCES e (Based on copper at 31.50c)

	Sheets, Strip, Plate	Rod	Wire	Seamless Tubes	Clean Heavy	Rod Ends	Clean Turnings
Copper	54.63b	52.86c	....	55.82	27.500	27.500	26.750
Yellow Brass	48.32	33.86d	48.86	51.73	20.750	19.875	18.875
Low Brass, 80%	51.28	51.22	51.82	54.59	23.250	23.000	22.500
Red Brass, 85%	52.33	52.27	52.87	55.64	24.250	24.000	23.500
Com. Bronze, 90%	53.92	53.86	54.46	56.98	25.250	25.000	24.500
Manganese Bronze	56.62	50.28	60.72	....	19.375	19.125	18.500
Muntz Metal	50.95	46.21	....	....	19.375	19.125	18.625
Naval Brass	52.90	46.71	59.46	56.31	19.250	19.000	18.500
Silicon Bronze	60.67	59.86	60.21	78.35	27.000	26.750	26.000
Nickel Silver, 10%	63.88	66.21	66.21	....	25.625	25.375	12.810
Phos. Bronze	75.34	75.84	75.84	77.02	28.625	28.375	27.375

a. Cents per lb, f.o.b. mill; freight allowed on 50 lb or more. b. Hot-rolled. c. Cold-drawn. d. Free cutting. e. Prices in cents per lb for less than 20,000 lb, f.o.b. shipping point. On lots over 20,000 lb at one time, of any or all kinds of scrap, add 1 cent per lb.

position turnings, 17.25-17.75; new brass clippings, 15.00-15.50; light brass, 12.00-12.50; heavy yellow brass, 13.00-13.50; new brass rod ends, 13.00-13.50; auto radiators, unsweated, 14.25-14.75; cocks and faucets, 14.75-15.00; brass pipe, 15.00-15.50.

Lead: Soft scrap lead, 8.75-9.25; battery plates, 4.50-4.75; linotype and stereotype, 10.00-10.50; electrotype, 8.25-8.75; mixed babbitt, 9 25-9.75.

Monel: Clippings, 30.00-32.00; old sheets 26.00-28.00; turnings, 20.00-22.00; rods, 30.00-32.00.

Nickel: Sheets and clips, 52.00-54.00; rolled anodes, 52.00-54.00; turnings, 39.00-40.00; rod ends, 52.00-54.00.

Zinc: Old zinc, 3.25-3.50; new diecast scrap, 3.00-3 25; old diecast scrap, 1.75-2.00.

Aluminum: Old castings and sheets, 11.00-11.50; clean borings and turnings, 7.00-7.50; segregated low copper clips, 15.00-15.50; segregated high copper clips, 14.00-14.50; mixed low copper clips, 14.50-15.00; mixed high copper clips, 12.50-13.00.

(Cents per pound, Chicago)

Aluminum: Old castings and sheets, 12.25-12.75; clean borings and turnings, 10.00-10.50; segregated low copper clips, 16.75-17.25; segregated high copper clips, 16.00-16.50; mixed low copper clips, 16.00-16.50; mixed high copper clips, 15.75-16.25.

(Cents per pound, Cleveland)

Aluminum: Old castings and sheets, 11.50-1175; clean borings and turnings, 10.50-11.00 segregated low copper clips, 15.75-16.25; segregated high copper clips, 14.75-15.25; mixed low copper clips, 15.25-15.75; mixed high copper clips, 14.25-14.75.

REFINERS' BUYING PRICES

(Cents per pound, carlots, delivered refinery)

Beryllium Copper: Heavy scrap, 0.020-in. and heavier, not less than 1.5% Be, 57.50; light scrap, 52.50; turnings and borings, 37.50.

Copper and Brass: No. 1 heavy copper and wire, 27 50; No 2 heavy copper and wire, 25.25; light copper, 22.75; refinery brass (60% copper) dry copper content, 24.50.

INGOTMAKERS' BUYING PRICES

Copper and Brass: No. 1 heavy copper and wire, 27.50; No. 2 heavy copper and wire, 25.25; light copper, 22.75; No. 1 composition borings, 22.25; No. 1 composition solids, 22.75; heavy yellow brass solids, 17.00; yellow brass turnings, 15.00; radiators, 18.00.

PLATING MATERIAL

(F.o.b. shipping point, freight allowed on quantities)

ANODES

Cadmium: Special or patented shapes, $1.30.

Copper: Flat-rolled, 47.79; oval, 46.00, 5000-10 000 lb; electrodeposited, 41.00, 2000-5000 lb lots; cast, 43.50, 5000-10,000 lb quantities.

Nickel: Depolarized, less than 100 lb, 114.25; 100-499 lb, 112.00; 500-4999 lb, 107.50; 5000-29,999 lb, 105.25; 30.000 lb, 103.00. Carbonized, deduct 3 cents a lb.

Tin: Bar or slab, less than 200 lb, 121.50; 200-499 lb, 120.00; 500-999 lb, 119.50; 1000 lb or more, 119.00.

Zinc: Balls, 18.50; flat tops, 18.50; flats, 21.25; ovals, 20.50, ton lots.

CHEMICALS

Cadmium Oxide: $1.30 per lb in 100-lb drums.

Chromic Acid (flake): 100-2000 lb, 31.00; 2000-10.000 lb, 30.50; 10,000-20,000 lb, 30.00; 20,-000 lb or more, 29.50.

Copper Cyanide: 100-200 lb, 65.90; 300-900 lb, 63.00; 1000-19,900 lb, 61.90.

Copper Sulphate: 100-1900 lb, 15.35; 2000-5900 lb, 13.35; 6000-11,900 lb, 13.10; 12,000-22,900 lb, 12.85; 23,000 lb or more, 12.35.

Nickel Chloride: 100 lb, 45.00; 200 lb, 43.00; 300 lb, 42.00; 400-4900 lb, 40.00; 5000-9900 lb, 38.00; 10.000 lb or more, 37.00.

Nickel Sulphate: 5000-22,999 lb, 29.00; 23,000-39,990 lb, 28.50; 40.000 lb or more, 28.00.

Sodium Cyanide (Cyanobrik): 200 lb, 23.80; 400-800 lb, 20.80; 1000-4900 lb, 19.80; 5000-19,900 lb, 18.80; 20.000 lb or more, 17.60.

Sodium Stannate: Less than 100 lb, 80.10; 100-600 lb, 70.70; 700-1900 lb, 68.00; 2000-9900 lb, 66.10; 10,000 lb or more, 64.80.

Stannous Chloride (Anhydrous): 25 lb, 155.60; 100 lb, 150.70; 400 lb, 148.30; 800-19,900 lb, 107.40; 20.000 lb or more, 101.30.

Stannous Sulphate: Less than 50 lb, 140.70; 50 lb, 110 70; 100-1900 lb, 108.70; 2000 lb or more, 106.70.

Zinc Cyanide: 100-200 lb, 59.00; 300-900 lb, 57.00.

(*Concluded from Page* 145)

tons in the second quarter vs. 195,-441 in the first three months of the year.

Shipments in the first six months were 412,077 tons, imports 9041 tons, exports 3671 tons, and apparent consumption, 417,447 tons.

Stocks of silicon alloys on March 31 totaled 88,796 tons. The breakdown of consumption January-March 1959, and stocks as of March 31 follow:

Consumption—Stocks of Silicon Alloys—1959

(Net tons)

Alloy:	Jan.-March Consumption	Stocks at End of March
Silvery pig iron 5-13 silicon	39,268	26,887
Silvery pig iron 14-20 silicon	45,587	25,526
Ferrosilicon 21-55 silicon	49,796	21,274
Ferrosilicon 56-70 silicon	9,770	2,052
Ferrosilicon 71-80 silicon	13,431	5,353
Ferrosilicon 81-89 silicon	1,273	623
Ferrosilicon 90-95 silicon	2,458	1,096
Silicon metal and refined silicon	4,073	1,409
Ferrosilicon briquets	4,636	2,407
Miscellaneous silicon alloys	5.283	2,169
Totals	175,575	88,796

Plates . . .

Plate Prices, Page 133

Platemakers report orders are piling up on their books. Some estimate that on the wide plates (over 48 in.) they will be booked solidly for three months, assuming early resuming of operations at strike-bound mills. They have enough work to keep them busy the rest of this year and will into first quarter of 1960 if the strike tieup continues much longer. Also, there is expanding demand for alloy plates.

In New England, heavier gage and alloy plates are in short supply. Most fabricators of lighter carbon plates can maintain operations for several weeks. They stocked heavier on light carbon grades than on the wide, heavier sizes of alloys. This is also true with respect to the warehouses, and gaps in inventories cannot be readily filled by the service centers.

It will be a week or ten days after the strike before platemakers are running their mills at 80 per cent of capacity, and at least two weeks before operations hit 95 per cent. Major mill repairs will be postponed as long as possible.

Sheared plates will be in stronger demand than universal plates after the strike, but flatcar building programs should help later. Inquiry for narrow widths and light gage carbon plates is less pressing than it has been.

Canadian Steel Mills Operating Near Capacity

Steel production is booming in Canada. Ingot output is running above 90 per cent of rated capacity with the Hamilton, Ont., mills operating above capacity.

The U. S. steel strike is partly responsible for the high production. Steel users that have been large importers of U. S. steel are rapidly depleting their inventories and are not sure of getting stock replacements. Many have turned to the Canadian mills.

Canadian steel users foresee only one serious shortage—heavy structurals, which are not produced in Canada. Heavy shapes are well stocked for old construction projects, but supplies are not available for new undertakings, and work slated to start later this year is being held up. Canadian mills are well booked to the yearend.

For the week ended Sept. 5, steel ingot output was 112,574 tons, which was 92.7 per cent of capacity vs. 110,727 tons, or 91.2 per cent, in the week preceding, and 43,197 tons, 38 per cent, in the corresponding week a year ago when output was curtailed by a strike.

Structural Shapes . . .

Structural Shape Prices, Page 133

Contract bidding on federal-aid state highway construction has been

CLASSIFIED

Positions Wanted

CHIEF ESTIMATOR—Sixteen years in charge of department for large West Coast plate, pressure vessel and machinery fabricators. Write Box 791, STEEL, Penton Bldg., Cleveland 13, Ohio.

CLASSIFIED RATES

All classifications other than "Positions Wanted" set solid, 50 words or less $15.00, each additional word .30, all capitals, 50 words or less $19.20, each additional word .38; all capitals leaded, 50 words or less $23.40, each additional word .47. "Positions Wanted" set solid, 25 words or less $3.60, each additional word .14, all capitals, 25 words or less $4.50, each additional word .18; all capitals leaded, 25 words or less $5.40, each additional word .22. Keyed address takes seven words. Cash with order necessary on "Positions Wanted" advertisements. Replies forwarded without charge. Displayed classified rates on request. Address your copy and instructions to STEEL, Penton Building, Cleveland 13, Ohio.

This tiny brass nut is mass produced to Class 3 tolerances for use in precision instruments. Typical of the miniature nuts FISCHER supplies to manufacturers of electrical and electronic equipment, it is countersunk both sides, burrless, cleaned and ready to install.

As the leading producer of *turned* nuts, FISCHER can supply standard, special and odd sizes or types of miniature brass nuts having diameters from 1/8" and threads from No. "O". All FISCHER nuts are made to exact customer specifications . . . and are competitively priced with nuts made by less precise methods.

If you need precision nuts . . . brass or aluminum . . . FISCHER is your best source.

there's no premium for precision at

Fischer SPECIAL MFG. CO.

476 MORGAN STREET • CINCINNATI 6, OHIO

8495-FS

resumed. Reason: The passage of legislation which increases the federal gasoline tax 1 cent (from 3 to 4 cents).

Bids have recently been opened on a $31.6 million program in New York State for 13 projects postponed from Aug. 6. Another opening on a $17.6 million program is planned for next month.

The increase in the federal gas tax will also stimulate highway development in other states.

Producers of structural shapes hope to have their mills running at 80 per cent of capacity a week or ten days after the strike is over. They will need about two weeks to push operations up to 95 per cent.

Wide flange beams will be in strongest demand and shortest supply after the strike-order backlogs average about three months. In standard shapes, producers are booked eight or ten weeks ahead.

STRUCTURAL SHAPES . . .

STRUCTURAL STEEL PLACED

1200 tons, powerhouse at Clear, Alaska, to Gate City Steel Inc., Boise, Idaho.

1000 tons, Bomarc missile installation, Adair Air Field, Oregon, to unstated interest; Donald M. Drake Co., Portland, Oreg., general contractor at $2,496,758.

940 tons, five composite rolled beam bridges, Lebanon-Bozrah-Norwich, Conn., to City Iron Works, Wethersfield, Conn., through Angelo Tomaso Inc., general contractor.

850 tons, Bomarc missile installation, Paine Air Field, Washington State, to Isaacson Iron Works, Seattle; John H. Sellen Construction Co., Seattle, general contractor at $2,486,125.

500 tons, building No. 9, Green Acres, Valley Stream, N. Y., through Dyker Building Co., general contractor, to August Bellon, Auburn, N. Y.

160 tons, factory, National Can Co., Hanover, Pa., through Brown & Matthews, New York, general contractor, to Altoona Steel & Pipe Co., Altoona, Pa.

150 tons, warehouse addition, Boy Scouts of America, New Brunswick, N. J., to Bethlehem Steel Co., Bethlehem, Pa.

150 tons, Bomarc installation, Paine Air Field, to Century Metal Works, Seattle.

109 tons, state bridge, Burlington, Conn., through Grandview Construction Co., general contractor, to American Bridge Div., U. S. Steel Corp., Pittsburgh.

STRUCTURAL STEEL PENDING

3089 tons, state bridgework, FARC 59-18, Broome County, New York, John Arborio, Poughkeepsie, N. Y., low on general contract.

2025 tons, and 275 tons, sheet piling, substructure, Merrimack River Bridge, Lawrence, Mass., J. F. White Contracting Co., Westwood, Mass., low on the general contract.

1857 tons, state bridgework, FISH 59-16, Jefferson County, New York, Arute Bros., New Britain, Conn., low on the general contract.

1825 tons, five state highway bridges, Seymour, Conn.; Mariana Construction Co., New Haven, Conn., low on the general contract; also, 995 tons of reinforcing bars and 395 tons of steel piles.

1410 tons, nine highway bridges and pavement, Newtown, Conn.; Arute Bros. Inc., New Britain, Conn., low on the general contract; also, 665 tons of reinforcing bars and 375 tons of mat reinforcement.

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Sept. 28

IN

STEEL

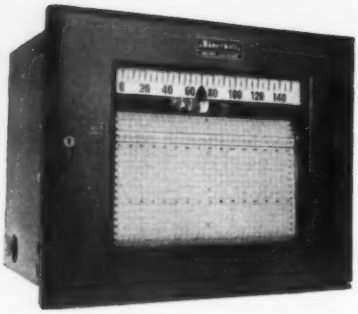
What Cost Price Fighting?

Next week you'll get a battlefield look at one of metalworking's peskiest problems—price fighting. Like bush warfare, price fighting is easy to start and tough to shut off. It has always been with us to some extent, but the fray grows hotter during recessions. It flared up sharply during the unlamented 1958 business troubles. And it's still going strong, despite the economy's upsurge.

STEEL editors will file an inspection report from the firing lines for you on this one. They'll also report on what can be done to stop the needless battle.

New Constant Voltage Unit makes *ElectroniK* instruments better than ever

by eliminating these problems

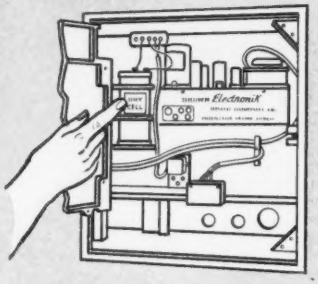


All new Precision Line *ElectroniK* circular and strip chart instruments have the new Honeywell Constant Voltage Unit that accurately regulates d-c reference supply to the measuring circuit. No more batteries, standard cells or standardizing mechanisms . . . and no more of the problems they pose.

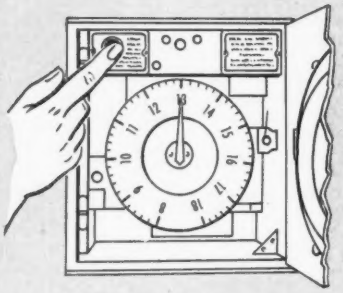
The Constant Voltage Unit delivers a constant, rectified voltage from line supply. It uses dependable Zener diodes and a reliable ambient temperature compensator.

This latest improvement in *ElectroniK* instruments assures even greater dependability, and less maintenance, and is still another reason why *ElectroniK* instruments are your best value in measurement and control. Get full details from your nearby Honeywell field engineer. Call him today . . . he's as near as your phone.

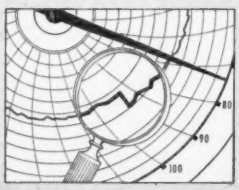
MINNEAPOLIS-HONEYWELL, Wayne and Windrim Avenues, Philadelphia 44, Pa.



No batteries **to replace . . . no recording or control deviation due to low battery voltage.**



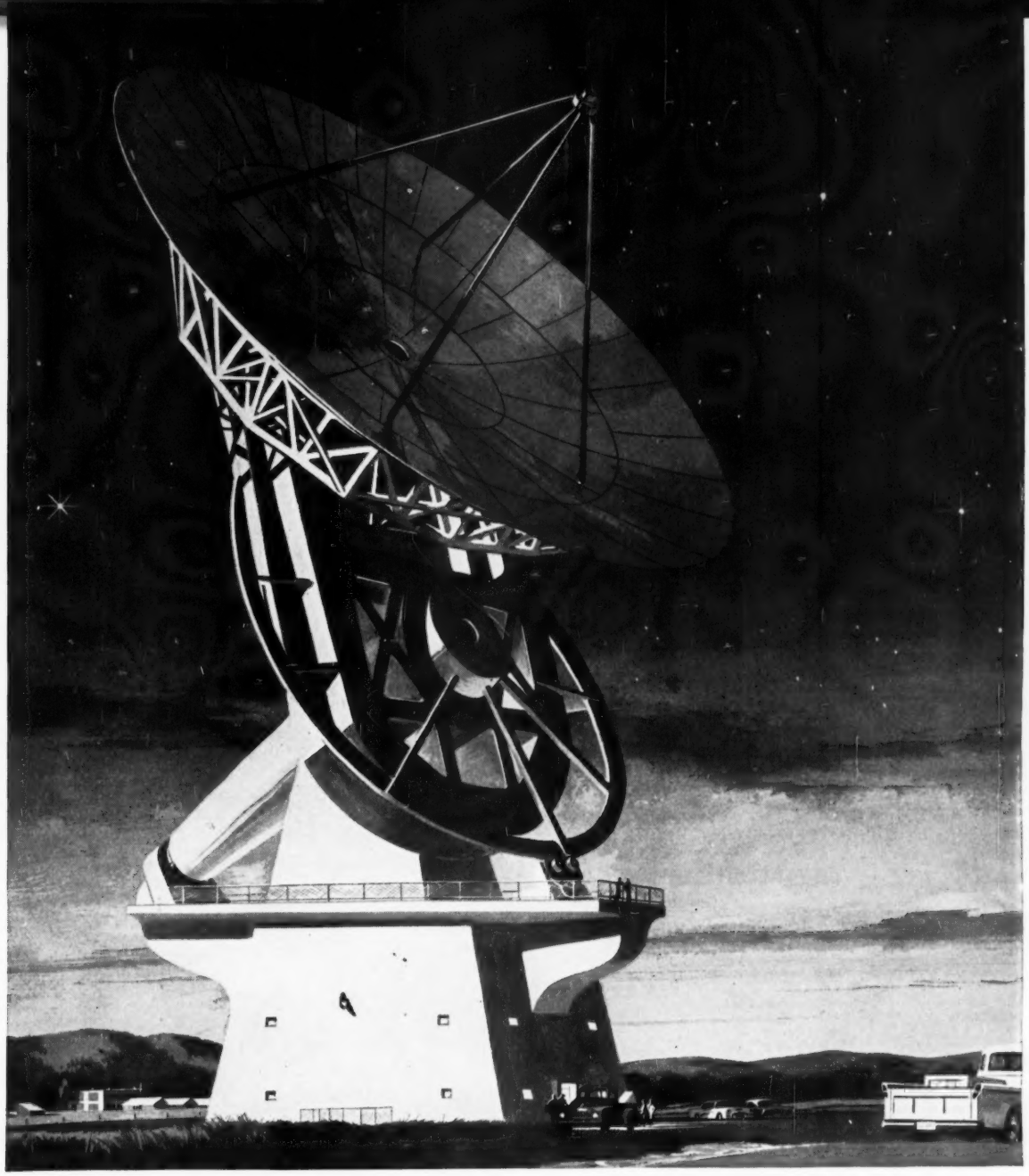
No button **to push on the instrument for standardization . . . no false readings because of failure to standardize.**



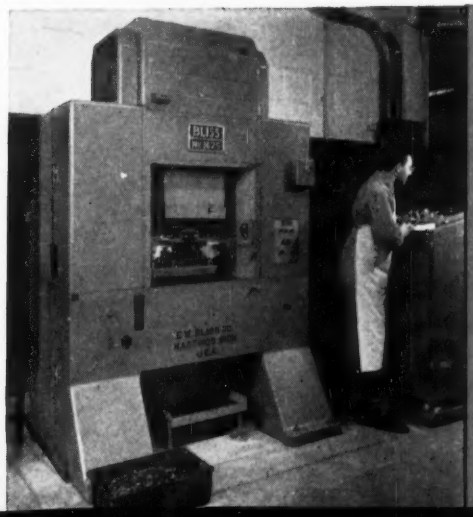
No blanks or shifts **in the instrument's response to variables. You get complete continuity of recording and control.**

Honeywell

First in Control



FROM ONE EXTREME TO ANOTHER



Challenging jobs requiring engineering skill as well as metal fabricating experience have a way of coming to Bliss. They may be projects involving massive size, like the 140-foot diameter radio telescope shown above . . . or the design and manufacture of high-speed precision machinery like the 1000-stroke per minute press to the left.

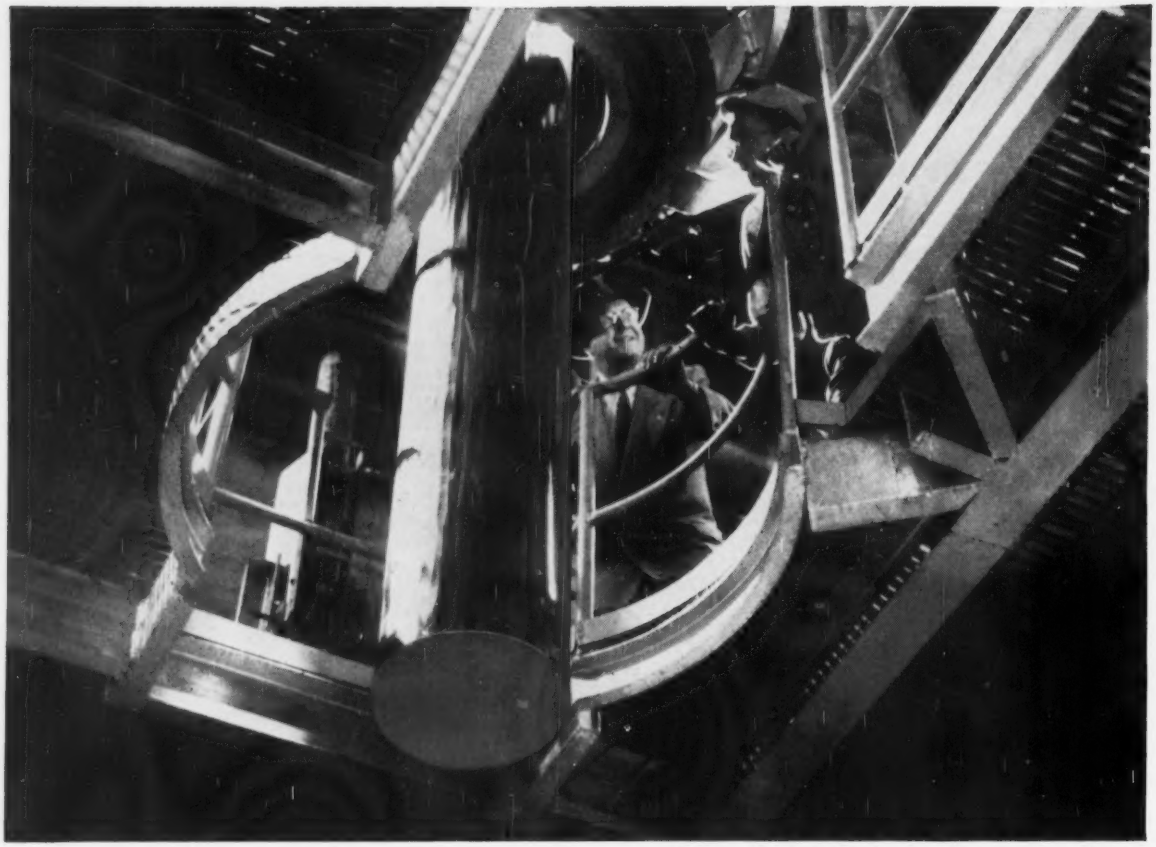
Whatever it is, if it's made of metal, you'll find that Bliss has the skills and facilities to take it from idea to completed project. These abilities have brought Bliss such jobs as steam catapults for land and carrier aircraft launching, runway overrun barriers, missile and atomic assemblies, special machinery, everything from small parts with tolerances running to the ten-thousandths to complete turn-key plants.

What does your job involve?

BLISS is more than a name
. . . it's a guarantee

E. W. BLISS COMPANY
Canton, Ohio

BLISS
SINCE 1857



Consumable electrode—heart of the vacuum arc furnace

New Timken® Vacuum Arc Steel:

Cleanest, strongest steel you can buy

IF you make or plan to make parts that must have exceptionally clean and strong steel, specify Timken® steel made by the vacuum arc process. It's ideal for aircraft, jet engine and other parts where such steel is vital. Timken vacuum arc process steel is the cleanest steel available in commercial quantities. And only the Timken Company furnishes this super-clean steel in bars, wire, and rotary-pierced tubing in a wide range of alloy and stainless analyses.

You get these advantages:

SUPERIOR CLEANLINESS. The melting process eliminates contamination from three basic sources—air, slag and crucible. Furthermore, gaseous impurities in the electrode metal are drawn out by the vacuum during melting.

BETTER DISPERSION. Any remaining non-metallics are more finely dispersed than by any other melting process.

These two factors—superior cleanliness and better dispersion—result in a more uniform steel of very high strength and ductility. For further information, write: The Timken Roller Bearing Company, Steel and Tube Division, Canton 6, Ohio. Cable: "TIMROSCO". *Makers of Tapered Roller Bearings, Fine Alloy Steels and Removable Rock Bits.*

WHEN YOU BUY TIMKEN STEEL YOU GET:

1. Quality that's uniform from heat to heat, bar to bar, order to order
2. Service from the experts in specialty steels
3. Over 40 years experience in solving tough steel problems

TIMKEN® *Fine Alloy* STEEL

TIMKEN ALLOY STEEL AND SEAMLESS STEEL TUBING ARE AVAILABLE FROM STEEL SERVICE CENTERS IN 44 CITIES IN THE UNITED STATES